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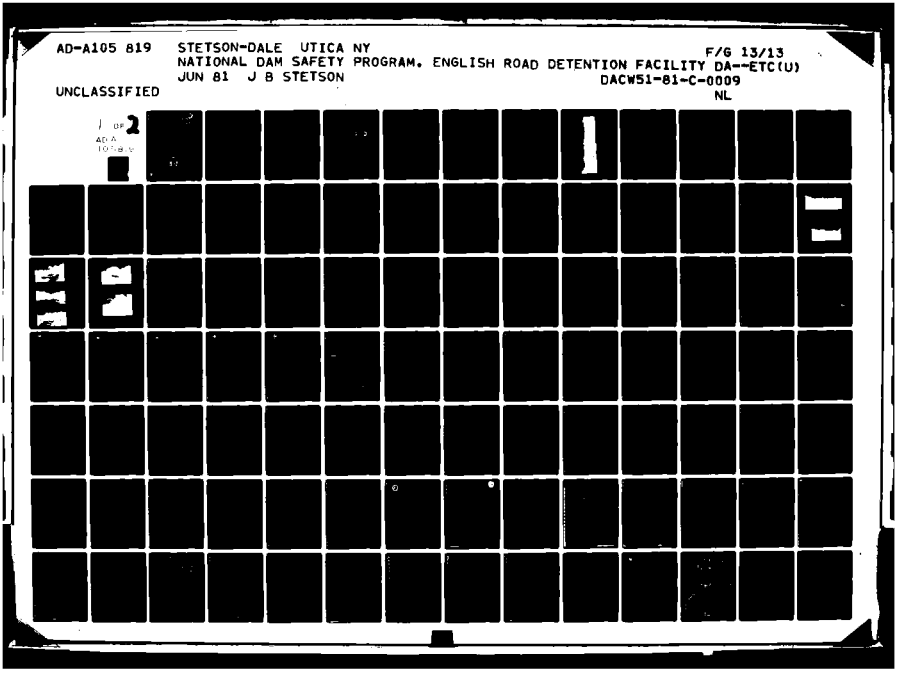


LAKE ONTARIO BASIN

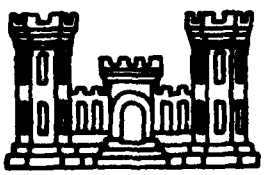
LEVEL II

ENGLISH ROAD DETENTION FACILITY DAM

NEW YORK

INVENTORY No. NY 996

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



NEW YORK DISTRICT CORPS OF ENGINEERS

MAY 1981

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English Road Detentition Facility Dam
Monroe County
Kake Ontario Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

The Phase I Inspection of the English Road Detention Facility Dam did not indicate conditions which would constitute an immediate hazard to human life or property.

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The hydrologic/hydraulic analysis indicates that the spillway is capable of passing the Probable Maximum Flood (PMF) with 1.7 feet of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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APPENDIX

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	English Road Detention Facility Dam I.D. No. NY 996
State Located:	New York
County:	Monroe
Watershed:	Lake Ontario Basin
Stream:	Paddy Hill Creek
Date of Inspection:	November 20, 1980

ASSESSMENT OF GENERAL CONDITIONS

The Phase I Inspection of the English Road Detention Facility Dam did not indicate conditions which would constitute an immediate hazard to human life or property.

The hydrologic/hydraulic analysis indicates that the spillway is capable of passing the Probable Maximum Flood (PMF) with 1.7 feet of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

The following remedial work should be undertaken within one year during normal maintenance operations:

1. Construction activities near the east abutment should be closely monitored to insure that damage to the dam does not occur in this area. Presently disturbed areas should be restored to the original condition.

2. Riprap lining the channel at the outlet of the control structure should be repaired, material covering the impact blocks removed and steps should be taken to control vandalism at the site.

3. A flood warning and emergency evacuation system should be implemented to alert the public should conditions occur which could result in failure of the dam.

4. A formalized inspection system should be initiated to develop data on conditions and maintenance operations at the facility, including the slopes and the area immediately downstream from the toe of the embankment. Deficiencies and the remedial measures undertaken to correct these deficiencies should be well documented to provide historical background on which future evaluations may be made.

Dale Engineering Company

John B. Stetson, President

Approved By: Col. W. M. Smith, Jr.
Date: New York District Engineer

30 JUN 1981

1. Overview of dam from upstream. Trashrack at inlet to control outlet at left. Right abutment behind trees to right of photo.

PHASE I INSPECTION REPORT
ENGLISH ROAD DETENTION FACILITY DAM I.D. NO. NY 996
LAKE ONTARIO BASIN
MONROE COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and the U.S. Army Corps of Engineers.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the English Road Detention Facility Dam and appurtenant structures, owned by the Town of Greece, New York, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the U.S. Army Corps of Engineers.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The English Road Detention Facility Dam is located in the Town of Greece, New York just south of English Road. The dam is an earth fill structure approximately 645 feet long with a maximum height of approximately 18 feet. The discharge control structure for this stormwater detention facility on Paddy Hill Creek consists of an 84 inch diameter concrete culvert which is used to regulate outflow from the impoundment during runoff events. There are no gate controls on the outlet culvert. The emergency spillway consists of a broad crested weir approximately 426 feet long which discharges to a downstream slope protected by a heavy stone fill. This embankment is at a slope of 1 vertical to 6-1/2 horizontal. The crest of the emergency spillway is protected from erosion by a 1 foot wide concrete wall which extends 4 feet below grade at the crest. Concrete abutments protect the embankment from the erosion effects of flow through the emergency spillway. The downstream toe of the emergency spillway channel is protected by a thickened section of heavy stone fill.

b. Location

The English Road Detention Facility Dam is located in the Town of Greece, Monroe County, New York.

c. Size Classification

The maximum height of the dam is approximately 18 feet. The volume of the impoundment is approximately 235 acre feet to the top of dam. Therefore, the dam is in the small size classification as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

Paddy Hill Creek, the receiving stream from the impoundment, flows through a heavily developed residential section of the Town of Greece. Several residences are located in close proximity to the stream channel. Therefore, the dam is in the high hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the Town of Greece, New York.

Contact: James S. Peet, P.E.
Town Engineer
Greece Town Hall
2505 West Ridge Road
Rochester, New York 14626
Telephone: (716) 225-2000

f. Purpose of the Dam

The dam is used as a stormwater retention facility to control flows in Paddy Hill Creek downstream from the facility.

g. Design and Construction History

The plans included in this report indicate that the dam was designed in 1977 with construction completed in 1978. The dam, as it presently exists, substantially conforms to the plans. No modifications have been made to the facility since its construction.

h. Normal Operational Procedures

The facility is operated by the Town of Greece. Flow is maintained through the outlet control structure during dry weather flow. During runoff events, the 84 inch pipe operates under inlet flow control to restrict discharge in the downstream channel. No regulating gates are provided at this facility. The facility is monitored weekly during dry weather flow. During runoff events, the facility is monitored every 2 hours or more often if required.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of English Road Detention Facility Dam is 4.25 square miles, 2,688 acres.

b. Discharge at Dam Site

Discharge records of the flood of record for this facility were not available for this report.

Computed Discharges:

Emergency Spillway, top of dam	16,210 cfs
*Drawdown Capacity	680 cfs

c. Elevation (feet above MSL)

Top of Dam	357.0
Spillway Crest	351.5
Stream Bed at Centerline of Dam	336.3
Invert of 84 inch Diameter Pipe	336.5

d. Reservoir

Length of Spillway Pool	2,700 ft.+
Length of Normal Pool	normally dry

e. Storage

Top of Dam	235 acre feet
Spillway Crest	120 acre feet

f. Reservoir Area

Top of Dam	22 acres
Spillway Crest	18.6 acres

g. Dam

Type - homogeneous earth fill
Length - 645
Height - 18+ feet
Freeboard Between Emergency Spillway and Top of Dam - 5.5 feet
Top Width - 10 feet
Side Slopes - upstream, 1 vertical to 3 horizontal; downstream 1 vertical to 6.5 horizontal
Zoning - none
Impervious Core - none
Grout Curtain - none

* Discharge through 84 inch diameter conduit with reservoir at spillway crest.

h. Emergency Spillway

Type - broad crested weir
Length - 426 feet
Crest Elevation - 351.5
Gates - none
U/S Channel - impoundment
D/S Channel - slope, 1 vertical to 6.5 horizontal protected by heavy stone fill

i. Regulating Outlets

84 inch concrete pipe - no flow regulating gate.

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

Geologically, English Road Detention Facility Dam is located in the Eastern Lake section of the Central Lowland Province which is part of the Interior Plains, the major physiographic division. The dam is sited on glacial debris which overlies the Queenston Shale of Upper Ordovician age. The Queenston is made up predominantly of thin-bedded argillaceous red shale which includes beds of siltstone and sandstone. Bedding is horizontal. The glacial debris is, for the most part, lacustrine having been deposited on the floor of the former glacial Lake Iroquois. Some of the lake floor was reworked to form beaches and sandbars. Isolated patches of ground moraine, covered by lake deposits, poke through on occasion due to the probable irregularity of its thickness above bedrock or due to erosion of its lake bed cover.

Several soil varieties are present in the vicinity of the dam. Permeability varies from moderately rapid to rapid, from 0.2 to more than 6.3 inches per hour, depending on the soil type.

b. Subsurface Investigations

Detailed subsurface investigations were conducted prior to the design of the facility. The records of these subsurface investigations are included in Appendix E. The plans (See Appendix F) indicate that the dam was to be keyed into bedrock, which is Queenston Shale. The boring records indicate mainly silt to fine sand with a gravel zone present above the bedrock.

2.2 DESIGN RECORDS

The engineering design computations and report are on file with the design engineers. A portion of this design report is included in Appendix E.

2.3 CONSTRUCTION RECORDS

Although the records kept during construction were not available for review, inquiry with the design engineers revealed that the construction was carried out under their direct supervision.

2.4 OPERATION RECORDS

The facility is monitored weekly during dry weather periods. An inspection check list (See Appendix E) is filled out during each inspection trip. The check list covers security measures at the site and documents the condition of the control outlet structure. During runoff events, the facility is monitored every 2 hours or more often if required. Elevations of the water level in the impoundment are recorded on a storage curve during each visit.

2.5 EVALUATION OF DATA

The data presented in this report was obtained from the Town Engineer of the Town of Greece and from the files of the New York Department of Environmental Conservation, Dam Safety Section. The information appears to be reliable and adequate for a Phase I Inspection Report.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

The English Road Detention Facility Dam was inspected on November 20, 1980. The Dale Engineering Company Inspection Team was accompanied on the inspection by James S. Peet, P.E., Town Engineer of the Town of Greece. At the time of the inspection, a light snow cover partially obscured the ground surface in the area. The weather was fair and sunny and temperature was in the mid 30's. At the time of the inspection, there was no water in the impoundment. Flow through the 84 inch control culvert was approximately 8 inches deep.

b. Dam

The embankment of the facility shows no signs of subsidence, misalignment, or sloughing of the slopes. Since the facility is a stormwater detention basin and no water was impounded at the time of the inspection, there was no evidence in the field of seepage at the toe or on the downstream slope of the embankment. The grassed slopes are in good condition with no signs of erosion. Highway construction was underway near the east abutment of the embankment. The ground surface in this area has been recently disturbed by this construction. There is some evidence of construction vehicle traffic on the dowstream slope of the embankment near the abutment.

c. Control Outlet

The outlet control structure was in good condition at the time of the inspection. The trashrack on the upstream end of the structure was free of debris and flow was unimpeded through the culvert.

d. Emergency Spillway

Concrete surfaces of the emergency spillway were in good condition, typical of new construction. The spillway channel immediately downstream from the spillway crest was overgrown with light brush. A roadway on the impoundment side of the facility shows signs of recent travel probably as a result of the highway construction near the east abutment.

e. Reservoir Area

The reservoir area at the spillway elevation extends approximately 2,700 feet upstream from the dam. The area in the impoundment remains in a natural state with light woods and brush prevailing throughout the area. Slopes at the edge of the impoundment at the maximum pool elevation are quite steep with no evidence of recent erosion. The Town Engineer indicated that the depth of water in the impoundment has never exceeded the top of the pipe of the control outlet.

f. Downstream Channel

The channel downstream from the control outlet is formed in sand and gravel. The riprap protection of the banks at the discharge point shows signs of vandalism through the displacement of the rock material. Despite the poor condition of the bank protection, no signs of recent erosion were evident in the field. Much of this riprap is presently covering the concrete energy dissipator blocks at the outlet of the control outlet.

3.2 EVALUATION

The visual inspection revealed that the dam is generally in good condition. Both the control outlet and the emergency spillway are in good condition and no signs of structural instability were detected.

The following specific items should be addressed by the Owner:

1. The riprap lining the channel at the outlet of the control structure should be replaced to prevent erosion of the channel during high flows and the material covering the energy dissipator blocks should be removed to allow this feature to operate as designed.

2. Close surveillance should be maintained on the construction operations presently underway near the east abutment to insure that the structural integrity of the embankment is not compromised due to these construction activities. The abutment should be restored to its original condition upon completion of the construction activities.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal operating procedure for this facility is to control flow in the downstream channel of Paddy Hill Creek to prevent flooding of residential properties during rainfall runoff events. This is accomplished by the restricted flow which occurs through the 84 inch diameter outlet structure. There are no facilities at this structure to regulate flows through the discharge pipe.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the Town of Greece. Periodic visits are made to the site to check on conditions of the facilities. An inspection checklist is completed based on the findings of the monitoring visit.

4.3 MAINTENANCE OF OPERATING FACILITY

Maintenance of the control outlet consists mainly of removing debris from the trashrack at the inlet to the culvert.

4.4 DESCRIPTION OF WARNING SYSTEM

No warning system is in effect at present.

4.5 EVALUATION

The dam and appurtenances are regularly inspected by representatives of the Town of Greece. The facility is presently in good condition. There is no evidence of deterioration caused by lack of maintenance. Since the dam is in the high hazard classification, a warning system should be implemented to alert the public should conditions occur which could result in failure of the dam.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The English Road Detention Facility Dam is a flood control structure located in the southeastern portion of the Town of Greece, some 1,000 feet south of English Road. The dam has a drainage area of 4.25 square miles which is characterized by suburban developments and some industrial developments. The structure is situated on Paddy Hill Creek, which flows in a northerly direction to its confluence with Round Pond Creek and eventually into Lake Ontario. Much of the drainage course upstream of the dam is channelized. The reservoir has a surface area of approximately 19 acres at the spillway crest. However, due to the operation of the structure as a flood control facility, the reservoir area is normally dry.

5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. This has been assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the reservoir and the dam's spillway system. The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration of run-off of a specific location that is considered reasonably possible for a particular drainage area.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions, based on experience and existing data, were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF. In the event that the dam could not pass 1/2 the Probable Maximum Flood without overtopping, additional analyses are to be performed on potential dam failures if the dam is designated as a High Hazard Classification. This process was done with the concept that, if the dam was unable to satisfy this criteria, further refined hydrologic investigations would be required.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB using the Modified Puls Method of flood routing was used to evaluate the dam, spillway capacity, and downstream hazard.

Unit hydrographs were defined by Snyder coefficients, C_t and C_p. Snyder's C_t was estimated to vary from 1.5 to 1.75 for the drainage area and C_p was estimated to be 0.625. The drainage area was divided into sub-areas to model the variability in hydrologic characteristics within the drainage basin.

Run-off, routing and flood hydrograph combining was then performed to obtain the flow into the reservoir. In this analysis, the reservoir pool was assumed to be at the spillway crest elevation at the start of the storm and outflow through the low level outlet was assumed to be zero.

The Probable Maximum Precipitation (PMP) was 21.5 inches according to Hydrometeorological Report (HMR #33) for a 24-hour duration storm, 200 square mile basin, while loss rates were set at 1.0 inches initial abstraction and 0.1 inch/hour continuous loss rate. The loss rate function yielded 86 percent run-off from the PMF. The peak for the PMF inflow hydrograph was 9,468 cfs and the 1/2 PMF inflow peak was 4,157 cfs. The storage capacity of the reservoir above the spillway only reduced these peak flows to 9,464 cfs for the PMF and 4,153 cfs for the 1/2 PMF flow.

5.3 SPILLWAY CAPACITY

The spillway is a broad crested weir type structure 426 feet in length with sloping upstream and downstream faces. A weir coefficient of 2.95 was assigned for the spillway rating curve development. The discharge capacity of the spillway at the top of dam elevation is 16,210 cfs.

SPILLWAY CAPACITY

Flood	Peak Discharge	Capacity as % of Flood Discharge
PMF	9,464 cfs	177%
1/2 PMF	4,153 cfs	390%

5.4 RESERVOIR CAPACITY

The reservoir storage capacity was obtained from the permit application for the facility (see Appendix E) and USGS mapping. The resulting estimates of the reservoir storage capacity are shown below:

Top of Dam	235 Acre Feet
Emergency Spillway Crest	120 Acre Feet

5.5 FLOODS OF RECORD

Discharge records of the floods of record for this facility were not available for this report.

5.6 OVERTOPPING POTENTIAL

The HEC-1 DB analysis indicates that the spillway can pass the PMF with 1.7 feet of freeboard and the 1/2 PMF with 3.3 feet of freeboard.

5.7 EVALUATION

The hydrologic/hydraulic analysis indicates that the spillway is capable of passing the Probable Maximum Flood (PMF) with 1.7 feet of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The English Road Detention Facility consists of an earthen embankment and an uncontrolled low level outlet and emergency spillway. The dam spans some 645 feet across the ravine, with the spillway occupying 426 feet of the central portion of the dam. The control section for the emergency spillway is formed by a concrete sill which extends across the entire crest width. A grassed earthen section leads up to this crest at a shallow slope and downstream of the crest the spillway channel bottom is lined with heavy stone fill to about 15 feet beyond the toe of slope. Concrete training walls extend from about 20 feet upstream of the spillway crest to just beyond the toe of slope, forming the sides of the emergency spillway channel. Earthen sections extend to either side of these training walls to where they tie into natural ground. An access road runs the entire length of the dam, passing just upstream of the training walls and spillway crest. The low level outlet consists of a reinforced concrete pipe that extends through the left portion of the embankment to the stone lined outlet channel. Outlet end treatment for this low level outlet consists of a concrete headwall and a concrete apron with concrete impact blocks.

The earthen embankment is well maintained, adequately mowed, and void of any brush or tree growth. The slopes are generally uniform with no evidence of structural movement or cracking. Near the vicinity of the right abutment, the earthen embankment has been disturbed somewhat as a result of the highway construction in the area. This disturbed area extends along the junction with natural ground on the downstream slope and leaves this area susceptible to erosion. The concrete spillway crest, training walls and low level outlet structures were all in excellent condition, although some minor diagonal surface cracking was noted in the right abutment wall. The low level outlet apron and impact blocks were covered with stones by vandals. The heavy stone fill on the emergency spillway channel showed some segregation by size of stone and there were some weeds growing up through the stone.

b. Design and Construction Data

No information regarding the stability of the structure was located. Drawings included in Appendix F substantially conform to the present facility. The drawings indicate that the embankment was specified to be constructed of impervious soil, although the gradation limits are such that the material could be as coarse as a silty sand and still satisfy the specifications. This embankment material was to be compacted to not less than 95% of standard proctor maximum density. The upstream slope was specified as 3:1 (horizontal to vertical) with a 10 foot wide maintenance ramp and the downstream slope as 6.5:1. A keyway trench was designed to run the length of the embankment, extending beneath the embankment to sound rock. The crest width of the earthen embankment was to be 10 feet and all of the embankment, with the exception of the spillway

and access roads were to be covered with topsoil and seeded. The emergency spillway channel was designed to be lined with 2 feet of heavy stone filling that is underlaid with 6 inches of bedding material and a fabric filter. This fabric filter was to be attached at its edges to the concrete spillway crest and the footings of the training walls.

Construction drawings for the project are dated July 1977 (with August 1977 revisions), and available correspondence indicates the project was completed in 1978.

c. Operating Records

The only formal operating records pertain to pool elevations, discharge condition of the low level outlet, and security measures.

d. Post Construction Changes

There is no field evidence or available information indicating post construction changes to the facility other than the previously mentioned disturbed area near the right abutment.

e. Seismic Stability

No known faults or lineaments suggesting faults are present in the immediate area. The area is located within Zone 2 of the Seismic Probability Map but is only 28 miles northeast of an active Zone 3 which has had earthquakes with intensities as great as VIII on the Modified Mercalli Scale. Only a few earthquakes have been recorded in the vicinity of the dam and are tabulated below:

Date	Intensity Modified Mercalli	Location Relative to Dam
1931	I	5 miles SE
1931	II	5 miles SE
1944	II	7 miles SE
1977	IV	17 miles SE

6.2 STRUCTURAL STABILITY ANALYSIS

The earthen embankment generally appeared to be uniform in section with no signs of structural instability in evidence. The area near the right abutment has been recently disturbed as a result of highway construction. This area should be restored to protect the facility.

The entire embankment and spillway facility, as well as areas beyond the toe of the slope, should be regularly inspected as a part of a formalized inspection program to detect deficiencies. Any deficiencies and the remedial measures undertaken to correct these deficiencies should be well documented to provide historical background on which future evaluations may be based.

SECTION 7: ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

The Phase I Inspection of the English Road Detention Facility Dam did not indicate conditions which would constitute an immediate hazard to human life or property.

The hydrologic/hydraulic analysis indicates that the spillway will pass 177% of the Probable Maximum Flood (PMF). Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

The visual inspection did not reveal conditions which would indicate evidence of structural displacement or instability.

The following specific safety assessments are based on the Phase I visual examination and analysis of hydrology and hydraulics, and structural stability:

1. The ground surface near the earthen embankment has been disturbed as a result of highway construction near the east abutment, leaving the area susceptible to erosion.

2. Riprap at the outlet of the control structure has been displaced by vandals; much of it thrown on the concrete apron, covering the concrete energy dissipator blocks.

3. No warning system is presently in effect to alert the public should conditions occur which could result in failure of the dam.

4. Although the facility is inspected regularly, the inspection program does not include a formalized inspection of the entire embankment and areas beyond the toe of slope.

b. Adequacy of Information

The information available is adequate for this Phase I investigation.

c. Urgency

Items 1 through 4 of the safety assessment should be addressed by the Owner and appropriate actions taken within one year of this notification.

d. Need for Additional Investigation

This Phase I inspection has not revealed the need for additional investigations regarding this structure.

7.2 RECOMMENDED MEASURES

The following is a list of recommended measures to be undertaken to insure safety of the facility:

1. Construction activities near the east abutment should be closely monitored to insure that further damage does not occur in this area. Presently disturbed areas should be restored to the original condition.

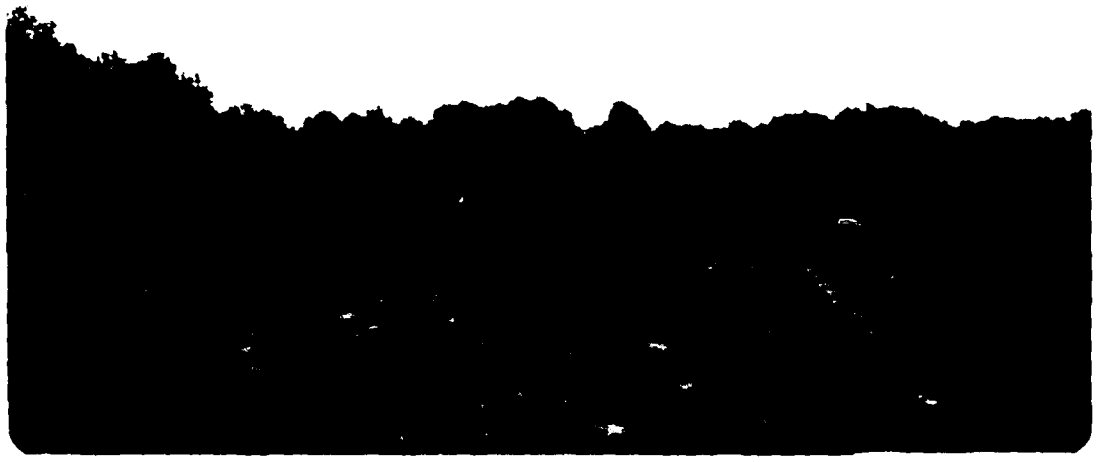
2. Riparp at the outlet of the control structure should be repaired, the material covering the concrete impact blocks removed, and steps should be taken to control vandalism at the site.

3. A flood warning and emergency evacuation system should be implemented to alert the public should conditions occur which could result in failure of the dam.

4. A formalized inspection system should be initiated to develop data on conditions and maintenance operations at the facility including the slopes and the area immediately downstream from the toe of the embankment. Deficiencies and the remedial measures undertaken to correct these deficiencies should be well documented to provide historical background on which future evaluations may be made.

APPENDIX A

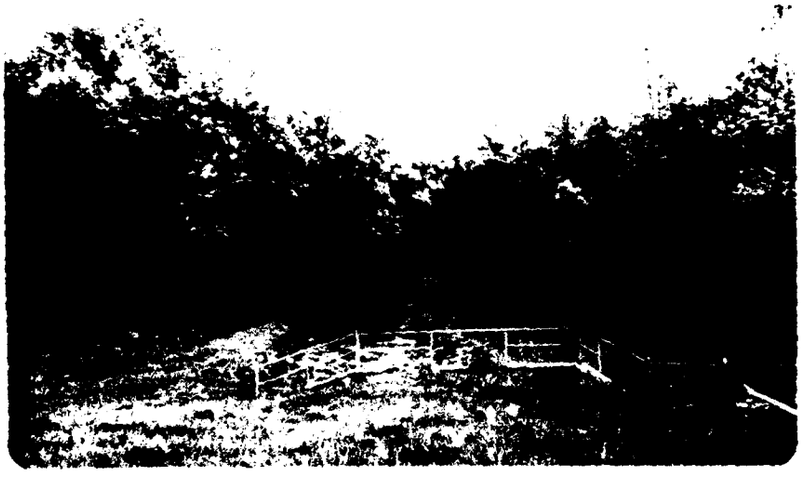
PHOTOGRAPHS



2. View along crest of emergency spillway. Impoundment area to right. Note disturbed areas of right abutment in background.

3. Looking along emergency spillway crest from right abutment

4. Upstream channel and impoundment area.



5. Channel downstream of control outlet.

6. Outlet headwall and channel at control outlet.

7. Emergency spillway outlet channel. Looking downstream from spillway crest.

8. Portion of downstream hazard. Stream to right of photo.

APPENDIX B

VISUAL INSPECTION CHECKLIST

93-15-3(9/80)

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam ENGLISH ROAD DETENTION FACILITY DAM

Fed. I.D. # N.Y. 996 DEC Dam No. _____

River Basin LAKE ONTARIO

Location: Town GREECE County MONROE

Stream Name PADDY HILL CREEK

Tributary of ROUND POND

Latitude (N) 43-14.0 Longitude (W) 77-40.5

Type of Dam EARTH

Hazard Category HIGH

Date(s) of Inspection NOV. 20, 1980

Weather Conditions FAIR (LIGHT SNOW COVER)

Reservoir Level at Time of Inspection NO WATER IMPOUNDED AT TIME OF INSPECTION

b. Inspection Personnel F.W. BYSZEWSKI, B.CALWELL, J. GOMEZ H. MUSKATT - DALE ENGINEERING COMPANY; J. PEET - TOWN ENGINEER TOWN OF GREECE

c. Persons Contacted (Including Address & Phone No.)

JAMES PEET P.E. TOWN ENGINEER

GREECE TOWN HALL TELEPHONE: 716-225-2000

2505 W. RIDGE RD.

ROCHESTER N.Y. 14626

d. History:

Date Constructed 1978 Date(s) Reconstructed —

Designer ERDMAN AND ANTHONY ASSOCIATES

Constructed By —

Owner TOWN OF GREECE.

2) Embankment

a. Characteristics

(1) Embankment Material "IMPERVIOUS EMBANKMENT" WITH GRADATION LIMITS AS DEFINED IN SPECS (SEE APPENDIX E)

(2) Cutoff Type "IMPERVIOUS EMBANKMENT"

(3) Impervious Core NONE

(4) Internal Drainage System NONE

(5) Miscellaneous —

b. Crest

(1) Vertical Alignment NO MISALIGNMENT OBSERVED.

(2) Horizontal Alignment NO MISALIGNMENT OBSERVED

(3) Surface Cracks NONE OBSERVED (LIGHT SNOW COVER AT TIME OF INSPECTION)

(4) Miscellaneous —

c. Upstream Slope

(1) Slope (Estimate) (V:H) 1:3

(2) Undesirable Growth or Debris, Animal Burrows NONE OBSERVED.

(3) Sloughing, Subsidence or Depressions NONE OBSERVED.

(4) Slope Protection NONE

(5) Surface Cracks or Movement at Toe NONE OBSERVED (LIGHT SNOW COVER AT TIME OF INSPECTION)

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 : 6.5

(2) Undesirable Growth or Debris, Animal Burrows NONE OBSERVED

(3) Sloughing, Subsidence or Depressions NONE OBSERVED

(4) Surface Cracks or Movement at Toe NONE OBSERVED (LIGHT SNOW COVER AT TIME OF INSPECTION)

(5) Seepage NONE OBSERVED (NO WATER IMPOUNDED AT TIME OF INSPECTION)

(6) External Drainage System (Ditches, Trenches; Blanket) NONE

(7) Condition Around Outlet Structure RIP RAP AT OUTLET OF STRUCTURE HAS BEEN DISPLACED. VANDALISM.

(8) Seepage Beyond Toe NONE NOTED NO WATER IMPOUNDED AT TIME OF INSPECTION.

e. Abutments - Embankment Contact

NO PROBLEMS NOTED - GOOD CONDITION.

(1) Erosion at Contact NONE

(2) Seepage Along Contact NONE OBSERVED (NO WATER IMPOUNDED AT TIME OF INSPECTION)

3) Drainage System

a. Description of System NONE

b. Condition of System —

c. Discharge from Drainage System —

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.) NONE

5) Reservoir

a. Slopes NO EVIDENCE OF INSTABILITY

b. Sedimentation MINOR SILTING OF STREAM AT TRASH RACK

c. Unusual Conditions Which Affect Dam DETENTION OF STORM WATER - NO IMPOUNDMENT MOST OF THE TIME.

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) RESIDENTIAL SUBDIVISIONS DOWN STREAM.

b. Seepage, Unusual Growth NONE OBSERVED

c. Evidence of Movement Beyond Toe of Dam NONE OBSERVED

d. Condition of Downstream Channel NO RECENT EROSION OBSERVED. BANKS ARE STABLE

7) Spillway(s) (Including Discharge Conveyance Channel)

SERVICE SPILLWAY IS AN 84" R.C.P. - NO OTHER CONTROL IS PROVIDED.

a. General GOOD CONDITION - NO MISALIGNMENT OBSERVED.

b. Condition of Service Spillway GOOD CONDITION.

c. Condition of Auxiliary Spillway EXCELLENT - NO FLOW HAS OCCURED SINCE IT'S CONSTRUCTION. SOME LIGHT BRUSH GROWING IN RIPRAP SLOPE

d. Condition of Discharge Conveyance Channel GOOD CONDITION NEVER USED.

8) Reservoir Drain/Outlet

Type: Pipe ✓ Conduit _____ Other _____

Material: Concrete ✓ Metal _____ Other _____

Size: 84" Length 154 L.F.

Invert Elevations: Entrance 336.5 Exit 335.7

Physical Condition (Describe): Unobservable _____

Material: GOOD RECENTLY CONSTRUCTED (1978)

Joints: OK Alignment GOOD

Structural Integrity: NO SIGN OF STRUCTURAL PROBLEMS

Hydraulic Capability: _____

Means of Control: Gate _____ Valve _____ Uncontrolled ✓

Operation: Operable _____ Inoperable _____ Other —

Present Condition (Describe): —

9) Structural

a. Concrete Surfaces EXCELLENT

b. Structural Cracking NONE OBSERVED

c. Movement - Horizontal & Vertical Alignment (Settlement)

NO MOVEMENT OBSERVED.

d. Junctions with Abutments or Embankments NO PROBLEMS NOTED.

e. Drains - Foundation, Joint, Face NONE

f. Water Passages, Conduits, Sluices NONE

g. Seepage or Leakage NONE

h. Joints - Construction, etc. OK

i. Foundation N/A

j. Abutments GOOD - NO PROBLEMS.

k. Control Gates NONE

l. Approach & Outlet Channels N/A

m. Energy Dissipators (Plunge Pool, etc.) N/A

n. Intake Structures N/A

o. Stability N/A

p. Miscellaneous N/A

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

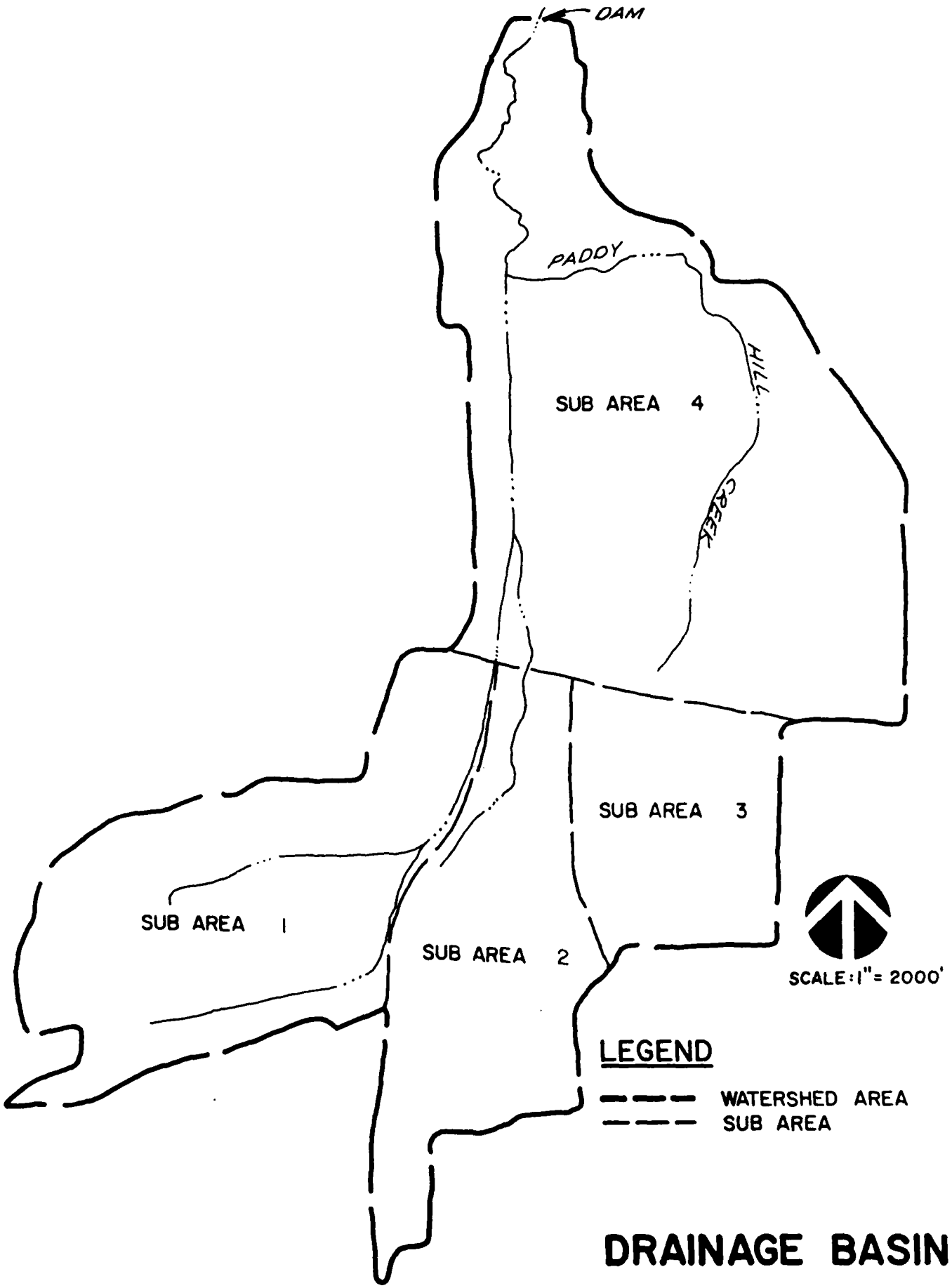
a. Description and Condition NONE.

11) Operation Procedures (Lake Level Regulation):

FACILITY IS INSPECTED TWICE WEEKLY.
MORE OFTEN DURING RUN-OFF EVENT.
OUTLET IS UNCONTROLLED.

APPENDIX C

HYDROLOGIC/HYDRAULIC, ENGINEERING DATA AND COMPUTATIONS



DRAINAGE BASIN

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501
TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections DATE

SUBJECT English Food Detention Facility PROJECT NO. 2520

Subarea Hydrologic Parameters DRAWN BY JAG

Subarea	Area	C_t	L	L_{CA}	$t_l = \frac{3}{4}(L \times L_{CA})^{0.3}$
1	1.067 mi²	1.5	1.93 mi	0.81 mi	1.72 hr
2	0.726	1.5	2.0	1.02	1.86
3	0.479	1.5	1.02	0.53	1.25
4	1.968	1.75	3.18	2.1	3.09
	Σ = 4.24 mi²				

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TEL 315-797-5600

DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE 12-19-80

SUBJECT English Road Detention Facility, ID# 996 PROJECT NO. 2520

Depth-Area-Duration DRAWN BY JAG

PMP from HMR # 33
for Lat. ~ 43°14' Long. ~ 77° 40.5'
Index Rainfall = 21.5" for 200 mi², 24 hr.
Zone 2

Duration	% Index*	Depth
6 hrs.	117	25.2"
12 hrs.	127	27.3
24 hrs	141	30.3
48 hrs	151	32.5

* Adjusted for site area, Drainage Area = 4.2 mi² (which is less than the lower limit of the area adjustment graph, 10 mi², therefore these values were adjusted for this lower limit)

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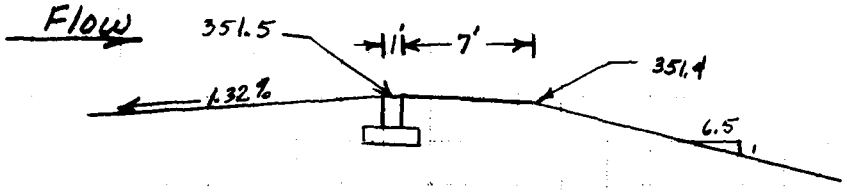
DESIGN BRIEF

PROJECT NAME NYS Dam Inspections -1981 DATE 2-3-81

SUBJECT English Road Detention Facility PROJECT NO 2520

Spillway Rating DRAWN BY JAC

Spillway Crest Elev. = 351.5
Spillway length = 426'
Top of Dam Elev. = 357



Spillway is approximately trapezoidal in profile and rectangular perpendicular to flow

$Q = C L H^{3/2}$
$C \sim 2.95$ for vertical sidewalls

Elev.	H (ft.)	Q (cfs)	
351.5	0	0	
352	0.5	444	
353	1.5	2309	
354	2.5	4968	
355	3.5	8229	
356	4.5	11,996	
357	5.5	16,210	Top of Dam

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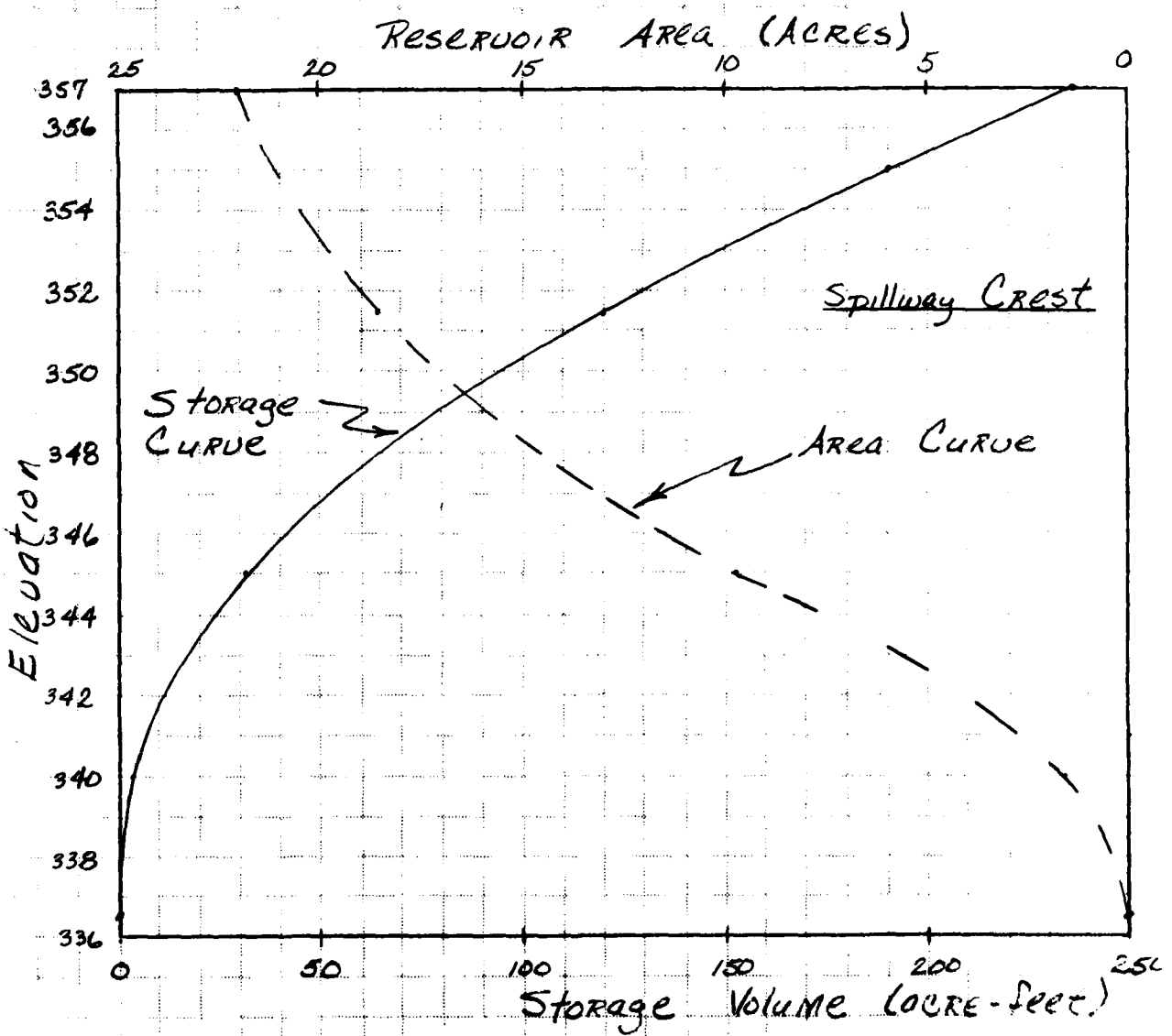
DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE 2-5-8

SUBJECT English Road Detention Facility PROJECT NO. 2510

Area Capacity Curve DRAWN BY



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DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections - 1981 DATE

SUBJECT English Road Detention Facility PROJECT NO.

Low Level Outlet Capacity DRAWN BY

84" RCP
L = 154'
Inlet Invert @ 336.5
Outlet Invert @ 335.7
Neglecting Trashrack Losses

A. Assuming Inlet Control
H = 351.5 - 336.5 = 15'
Q = 680 cfs

B. Assuming Outlet Control if outlet unsubmerged
HW + So L = 351.5 - 335.7 = 15.8'
Q = 760 cfs
therefore inlet control would govern unless the outlet is submerged sufficiently.

NY # 996

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	357	22	235
2) Design High Water (Max. Design Pool)	355	21	190
3) Principal [redacted] Spillway Crest	336.5	0	0
4) Pool Level with Flashboards	N/A		
5) Service Spillway Crest	351.5	18.6	120

DISCHARGES

	Volume (cfs)
1) Average Daily	Unknown
2) Spillway @ Maximum High Water	16210
3) Spillway @ Design High Water	8230
4) Spillway @ Auxiliary Spillway Crest Elevation	N/A
5) Low Level Outlet (84"Ø RCP, RCS. @ Top of Dam, Elev. 357)	850
6) Total (of all facilities) @ Maximum High Water	17060
7) Maximum Known Flood	Unavailable
8) At Time of Inspection	Unknown

CREST: ELEVATION: 357

Type: Earth fill

Width: 18' Length: 645'

Spillover None (emergency Spillway @ Right abutment)

Location

SPILLWAY:

PRINCIPAL		EMERGENCY
336.5	Elevation	351.5
84"Ø RCP	Type	Broad crested weir
	Width	426'
	Type of Control	
✓	Uncontrolled	✓
	Controlled:	
	Type (Flashboards; gate)	
	Number	
	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
	Chute Length	
	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

CREST: ELEVATION: 357

Type: Earth fill

Width: 18' Length: 645'

Spillover None (Emergency Spillway @ Right abutment)

Location

SPILLWAY:

PRINCIPAL		EMERGENCY
336.5	Elevation	351.5
84"ϕ RCP	Type	Broad crested weir
	Width	426'
	Type of Control	
✓	Uncontrolled	✓
	Controlled:	
	Type (Flashboards; gate)	
	Number	
	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
	Chute Length	
	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

HYDROMETEROLOGICAL GAGES:

Type : None

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: No formalized system

Method of Controlled Releases (mechanisms):

None other than the control provided by the discharge capacity of the uncontrolled low level outlet (84"Ø pipe)

DRAINAGE AREA: 4.25 mi²

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: 20% commercial, industrial, 80% suburban

Terrain - Relief: Moderately Sloped

Surface - Soil: —

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

Upper portion of drainage area may be subject to urbanization

Potential Sedimentation problem areas (natural or man-made; present or future)

None Known

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

None at present

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: No low reaches

Elevation:

Reservoir:

Length @ Maximum Pool 0.5± (Miles)

Length of Shoreline (@ Spillway Crest) 1.1± (Miles)

```
(0001)   A1       ENGLISH RD. DETENTION FACILITY    FILE IS ABQD
(0002)   A2       HEC1-DB (SNYDER PAREMETERS)
(0003)   A3       PMF - DAM OVER TOPPING ANALYSIS
(0004)   B     300        0        10        0        0        0        0        0        4        0
(0005)   B1      5        0         0        0        0        0        0        0        0        0
(0006)   J       1        7         1        0        0        0        0        0        0        0
(0007)   J1    0.2      0.3       0.4      0.5      0.6      0.8      1.0        0        0        0
(0008)   K       0      100         0        0        0        0        1        0        0        0
(0009)   K1        RUNOFF SUBAREA 1
(0010)   M       1        1     1.067        0     4.24        0        0        0        1        0
(0011)   P       0     21.5       117      127      141      151        0        0        0        0
(0012)   T       0        0         1        0        0        0      1.0      0.1        0     0.03
(0013)   W    1.72    0.625         0        0        0        0        0        0        0        0
(0014)   X    -2.0    -0.10       1.6        0        0        0        0        0        0        0
(0015)   K       1      101         0        0        0        0        1        0        0        0
(0016)   K1        ROUTE UNDER RIDGE ROAD
(0017)   Y       0        0         0        1        1        0        0        0        0        0
(0018)   Y1      1        0         0        0        0        0       -1        0        0        0
(0019)   Y2      0        4        10       11        0        0        0        0        0        0
(0020)   Y3      0      760      1260     3500        0        0        0        0        0        0
(0021)   Y4    409      411       413      415      417      420      423      426      429      432
(0022)   Y4    433
(0023)   Y5      0       70       200      370      550      760      900     1000     1150     1260
(0024)   Y5   3500
(0025)   K       1      410         0        0        0        0        1        0        0        0
(0026)   K1        ROUTE TO CONFLUENCE W/ SUBAREA 2
(0027)   Y       0        0         0        1        1        0        0        0        0        0
(0028)   Y1      1        0         0        0        0        0       -1        0        0        0
(0029)   Y6    .06     .035      .06      397      410     2000    0.006        0        0        0
(0030)   Y7    100      410       150      405      188      401      200      397      215      397
(0031)   Y7    227      401       260      405      300      410        0        0        0        0
(0032)   K       0      200         0        0        0        0        1        0        0        0
(0033)   K1        RUNOFF SUBAREA 2
(0034)   M       1        1     0.726        0     4.24        0        0        0        1        0
(0035)   P       0     21.5       117      127      141      151        0        0        0        0
(0036)   T       0        0         0        0        0        0      1.0      0.1        0     0.05
(0037)   W    1.85    0.625         0        0        0        0        0        0        0        0
(0038)   X    -2.0    -0.10       1.6        0        0        0        0        0        0        0
```

```
(0039)   K      1     201       0       0       0       0       1       0       0       0
(0040)   K1       ROUTE UNDER RIDGE RD.
(0041)   Y      0       0       0       1       1       0       0       0       0       0
(0042)   Y1     1       0       0       0       0       0      -1       0       0       0
(0043)   Y2     0      50     175     300
(0044)   Y3     0     230     270    3400
(0045)   Y4   414     416     418     420     424     428     432     433
(0046)   Y5     0      40     130     210     230     250     270    3400
(0047)   K      1     410       0       0       0       0       1       0       0       0
(0048)   K1       ROUTE TO CONFLUENCE W/SUBAREA 1
(0049)   Y      0       0       0       1       1       0       0       0       0       0
(0050)   Y1     1       0       0       0       0       0      -1       0       0       0
(0051)   Y6   .06    .035     .06     397     410    2000  0.0085       0       0       0
(0052)   Y7   100     410     150     405     188     401     200     397     215     397
(0053)   Y7   227     401     260     405     300     410       0       0       0       0
(0054)   K      2     410       0       0       0       0       1       0       0       0
(0055)   K1       COMBINE 2 HYDROGRAPHS 1 & 2
(0056)   K      1     410       0       0       0       0       1       0       0       0
(0057)   K1       ROUTE TO RESERVOIR
(0058)   Y      0       0       0       1       1       0       0       0       0       0
(0059)   Y1     1       0       0       0       0       0      -1       0       0       0
(0060)   Y6   .07    .035     .07     352     365    8000  0.0056       0       0       0
(0061)   Y7   100     365     150     360     188     356     200     352     215     352
(0062)   Y7   227     356     260     360     300     365       0       0       0       0
(0063)   K      0     300
(0064)   K1       RUNOFF SUBAREA 3
(0065)   M      1       1   0.479       0    4.24       0       0       0       1
(0066)   P      0    21.5     117     127     141     151
(0067)   T      0       0       0       0       0       0     1.0     0.1       0   0.075
(0068)   W   1.25   0.625
(0069)   X   -2.0   -0.10     1.6
(0070)   K      1     301       0       0       0       0       1
(0071)   K1       ROUTE UNDER RIDGE RD.
(0072)   Y      0       0       0       1       1
(0073)   Y1     1       0       0       0       0       0      -1
(0074)   Y2     0       1       2       5      10      18      30      47
(0075)   Y3     0      23      47      72      90     110    1780    5090
(0076)   Y4   413     415     416     417     418     419     420     421
```

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(0077)  Y5      0       23       47       72       90      110      178      509
(0078)  K       1      401        0        0        0        0        1
(0079)  K1        ROUTE TO RESERVOIR
(0080)  Y       0        0        0        1        1
(0081)  Y1      1        0        0        0        0        0       -1
(0082)  Y6    .07     .035      .07      352      365    16800    0.004
(0083)  Y7    100      365      150      360      188      356      200      352      215      352
(0084)  Y7    227      356      260      360      300      365
(0085)  K       0      400        0        0        0        0        1        0        0        0
(0086)  K1        RUNOFF SUBAREA 4
(0087)  M       1        1    1.968        0     4.24        0        0        0        1        0
(0088)  P       0     21.5      117      127      141      151        0        0        0        0
(0089)  T       0        0        0        0        0        0      1.0      0.1        0      .04
(0090)  W    3.10    0.625        0        0        0        0        0        0        0        0
(0091)  X    -2.0    -0.10      1.6        0        0        0        0        0        0        0
(0092)  K       3      400        0        0        0        0        1        0        0        0
(0093)  K1        COMBINE 3 HYDROGRAPHS     TOTAL RESERVOIR INFLOW
(0094)  K       1      400        0        0        0        0        1        0        0        0
(0095)  K1        ROUTE THRU RESERVOIR AND OVER SPILLWAY
(0096)  Y       0        0        0        1        1        0        0        0        0        0
(0097)  Y1      1        0        0        0        0        0   -351.5        0        0        0
(0098)  $S      0      120      130      148      170      192      213      235        0        0
(0099)  $E  336.5    351.5      352      353      354      355      356      357        0        0
(0100)  $$  351.5      426     2.95      1.5        0        0        0        0        0        0
(0101)  $D    357     2.65      1.5      300        0        0        0        0        0        0
(0102)  K      99        0        0        0        0        0        0        0        0        0
(0103)  A
(0104)  A
(0105)  A
(0106)  A
(0107)  A
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT		100
ROUTE HYDROGRAPH TO		101
ROUTE HYDROGRAPH TO		410
RUNOFF HYDROGRAPH AT		200
ROUTE HYDROGRAPH TO		201
ROUTE HYDROGRAPH TO		410
COMBINE	2 HYDROGRAPHS AT	410
ROUTE HYDROGRAPH TO		410
RUNOFF HYDROGRAPH AT		300
ROUTE HYDROGRAPH TO		301
ROUTE HYDROGRAPH TO		401
RUNOFF HYDROGRAPH AT		400
COMBINE	3 HYDROGRAPHS AT	400
ROUTE HYDROGRAPH TO		400
END OF NETWORK		

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
**********************************

RUN  DATE?WED, MAR 04 1981
     TIME?08:01:31


                        ENGLISH RD. DETENTION FACILITY    FILE IS ABQD
                        HEC1-DB (SNYDER PAREMETERS)
                        PMF - DAM OVER TOPPING ANALYSIS

                                    JOB SPECIFICATION
          NQ      NHR     NMIN     IDAY      IHR     IMIN    METRC     IPLT     IPRT    NSTAN
         500        0       10        0        0        0        0        0        4        0
                                   JOPER      NWT    LROPT    TRACE
                                       5        0        0        0


                                MULTI-PLAN ANALYSES TO BE PERFORMED
                                    NPLAN= 1 NRTIO= 7 LRTIO= 1
                  RTIOS=    0.20    0.30    0.40    0.50    0.60    0.80    1.00


**********        **********        **********        **********        **********

                                    SUB-AREA RUNOFF COMPUTATION

                RUNOFF SUBAREA 1
                          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            100       0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
              IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                  1       1    1.87    0.00    4.24    0.00   0.000       0       1       0

                                        PRECIP DATA
                        SPFE     PMS      R6      R12     R24     R48     R72     R96
                        0.00   21.50  117.00  127.00  141.00  151.00    0.00    0.00
    TRSPC COMPUTED BY THE PROGRAM IS 0.800

                                        LOSS DATA
            LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                    UNIT HYDROGRAPH DATA
                                TP=  1.72    CP=  .63    NTA=  6
```

RECESSION DATA

STRTQ= -2.CC QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 56 END-OF-PERIOD ORDINATES, LAG= 1.7C HOURS, CP= 0.63 VOL= 1.CC

8.	29.	58.	92.	129.	167.	202.	230.	249.	259.
260.	246.	223.	200.	180.	162.	145.	131.	117.	106.
95.	85.	77.	69.	62.	56.	50.	45.	40.	36.
33.	29.	26.	24.	21.	19.	17.	15.	14.	12.
11.	10.	9.	8.	7.	7.	6.	5.	5.	4.
4.	3.	3.	3.	3.	2.				

Q END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	25.97	22.34	3.63	92305.
										(660.)(567.)(92.)(2605.29)			

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HYDROGRAPH ROUTING

ROUTE UNDER RIDGE ROAD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
101	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

STORAGE	0.00	4.00	10.00	11.00					
OUTFLOW	0.00	760.00	1260.00	3500.00					
STAGE	409.00	411.00	413.00	415.00	417.00	420.00	423.00	426.00	429.00
	433.00								
FLOW	0.00	70.00	200.00	370.00	550.00	760.00	980.00	1100.00	1150.00
	3500.00								

MAXIMUM STAGE IS 417.6

MAXIMUM STAGE IS 422.6

MAXIMUM STAGE IS 429.7

MAXIMUM STAGE IS 432.1

MAXIMUM STAGE IS 432.2

MAXIMUM STAGE IS 432.5

MAXIMUM STAGE IS 432.6

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HYDROGRAPH ROUTING

ROUTE TO CONFLUENCE W/ SUBAREA 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
410	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0600	0.0350	0.0600	397.0	410.0	2000.	0.00600

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 410.00 150.00 405.00 188.00 401.00 200.00 397.00 215.00 397.00
227.00 401.00 260.00 405.00 300.00 410.00

STORAGE	0.00	0.54	1.20	1.99	2.92	3.97	5.15	6.63	8.48
	13.34	16.34	19.72	23.49	27.65	32.19	37.12	42.43	48.13
OUTFLOW	0.00	27.48	92.16	191.97	328.74	505.03	731.23	1049.43	1429.30
	2483.08	3509.29	3702.35	4487.47	5370.39	6356.13	7449.57	8655.48	9978.51
STAGE	397.00	397.68	398.37	399.05	399.74	400.42	401.11	401.79	402.47
	403.84	404.53	405.21	405.89	406.58	407.26	407.95	408.63	409.32
FLOW	0.00	27.48	92.16	191.97	328.74	505.03	731.23	1049.43	1429.30
	2483.08	3509.29	3702.35	4487.47	5370.39	6356.13	7449.57	8655.48	9978.51

MAXIMUM STAGE IS 400.7

MAXIMUM STAGE IS 401.4

MAXIMUM STAGE IS 402.9

MAXIMUM STAGE IS 402.6

MAXIMUM STAGE IS 403.0

MAXIMUM STAGE IS 403.8

MAXIMUM STAGE IS 404.5

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
200	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.73	0.00	4.24	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	117.00	127.00	141.00	151.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.05

UNIT HYDROGRAPH DATA

TP= 1.85 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 62 END-OF-PERIOD ORDINATES, LAG= 1.86 HOURS, CP= 0.63 VOL= 1.00

4.	16.	33.	52.	73.	95.	116.	135.	149.	158.
163.	162.	155.	139.	120.	114.	104.	94.	86.	78.
70.	64.	58.	53.	48.	43.	39.	36.	32.	29.
27.	24.	22.	20.	18.	16.	15.	14.	12.	11.
10.	9.	8.	8.	7.	6.	6.	5.	5.	4.
4.	3.	3.	3.	3.	2.	2.	2.	2.	2.
1.	1.								

0 END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

SUM 25.97 22.41 3.56 62531.
(660.)(569.)(90.)(1770.68)

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HYDROGRAPH ROUTING

ROUTE UNDER RIDGE RD.

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
201	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
C.0	0.CCO	C.CO	1	1	0	0	C

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	C

STORAGE	C.0C	5C.CC	175.CC	300.00				
OUTFLOW	C.0C	23C.CC	270.0C	3400.00				
STAGE	414.0C	416.CC	41e.CC	420.00	424.CC	428.CO	432.CC	433.00
FLOw	C.0C	4C.CC	13C.0C	210.0J	23C.0C	25C.C0	27C.CC	34CJ.0C

MAXIMUM STAGE IS 424.5

MAXIMUM STAGE IS 427.6

MAXIMUM STAGE IS 431.2

MAXIMUM STAGE IS 432.1

MAXIMUM STAGE IS 432.2

MAXIMUM STAGE IS 432.3

MAXIMUM STAGE IS 432.5

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HYDROGRAPH ROUTING

ROUTE TO CONFLUENCE #/SUBAREA 1

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
41J	1	J	(	J	,	1	3	

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
C.C	0.CCC	C.CC	1	1	0	0	C

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	C.CCC	C.CCC	-1.	C

NORMAL DEPTH CHANNEL ROUTING

GN(1)	GN(2)	GN(3)	ELNVT	ELMAX	RLNTH	SEL
C.C6C0	C.035C	0.06CC	397.0	410.C	2000.	0.C085C

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 410.00 150.00 405.00 188.00 401.00 200.00 397.00 215.00 397.00
227.00 401.00 260.00 405.00 300.00 410.00

STORAGE	0.00	0.54	1.20	1.99	2.92	3.97	5.15	6.63	8.48
	13.34	16.34	19.72	23.49	27.65	32.19	37.12	42.43	48.13
OUTFLOW	0.00	32.71	109.69	228.49	391.28	601.11	870.33	1249.07	1761.21
	2860.24	3581.78	4406.68	5341.17	6392.04	7565.30	8866.77	10302.09	11876.80
STAGE	397.00	397.6e	398.37	399.05	399.74	400.42	401.11	401.79	402.47
	403.84	404.53	405.21	405.89	406.58	407.26	407.95	408.63	409.32
FLOW	0.00	32.71	109.69	228.49	391.28	601.11	870.33	1249.07	1761.21
	2860.24	3581.78	4406.68	5341.17	6392.04	7565.30	8866.77	10302.09	11876.80

MAXIMUM STAGE IS 399.1

MAXIMUM STAGE IS 399.1

MAXIMUM STAGE IS 399.2

MAXIMUM STAGE IS 400.4

MAXIMUM STAGE IS 401.1

MAXIMUM STAGE IS 401.9

MAXIMUM STAGE IS 402.5

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COMBINE HYDROGRAPHS

COMBINE 2 HYDROGRAPHS 1 & 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
410	2	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

ROUTE TO RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
410	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPPP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0700	0.0350	0.0700	352.0	365.0	8000.	0.00560

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 365.00 150.00 360.00 188.00 356.00 200.00 352.00 215.00 352.00
227.00 356.00 260.00 360.00 300.00 365.00

STORAGE	0.00 53.36	2.14 65.36	4.80 76.89	7.96 93.96	11.67 110.58	15.87 128.75	20.61 148.46	26.50 169.72	33.93 192.53
OUTFLOW	0.00 2297.64	26.55 2864.68	89.03 3508.52	185.46 4233.33	317.60 5043.69	487.91 5943.66	706.43 6937.16	1013.06 8028.02	1376.68 9220.00
STAGE	352.00 358.84	352.68 359.53	353.37 360.21	354.05 360.89	354.74 361.58	355.42 362.26	356.11 362.95	356.79 363.63	357.47 364.32
FLOW	0.00 2297.64	26.55 2864.68	89.03 3508.52	185.46 4233.33	317.60 5043.69	487.91 5943.66	706.43 6937.16	1013.06 8028.02	1376.68 9220.00

MAXIMUM STAGE IS 356.3

MAXIMUM STAGE IS 357.0

MAXIMUM STAGE IS 357.5

MAXIMUM STAGE IS 358.0

MAXIMUM STAGE IS 358.7

MAXIMUP STAGE IS 360.1

MAXIMUM STAGE IS 361.1

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
300	0	0	0	3	0	0	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.48	0.00	4.24	0.00	C.00C	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
C.0C	21.5C	117.0C	127.0C	141.0C	151.0C	0.00	C.00

TRSPC COMPUTED BY THE PROGRAM IS C.6C0

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
C	C.00	0.00	1.0C	C.00	C.0C	1.0C	1.0C	C.1C	C.CC	C.C?

UNIT HYDROGRAPH DATA

TP= 1.25 CP=C.63 NTA= C

RECESSION DATA

STRTQ= -2.CC QRCSN= -C.10 RTIOR= 1.60

UNIT HYDROGRAPH 41 END-OF-PERIOD ORDINATES, LAG= 1.24 HOURS, CP= C.63 VOL= 1.CC

7.	27.	53.	83.	114.	138.	154.	159.	151.	133.
115.	99.	85.	74.	64.	55.	47.	41.	35.	30.
26.	22.	19.	17.	14.	12.	11.	9.	8.	7.
6.	5.	4.	4.	3.	3.	2.	2.	2.	2.
1.									

C

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	END-OF-PERIOD FLOW COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	25.97	22.51	3.46	42160.
										(.CC)(572.)(88.)(1194.57)			

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HYDROGRAPH ROUTING

ROUTE UNDER RIDGE RD.

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
301	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

STORAGE	0.00	1.00	2.00	5.00	10.00	18.00	30.00	47.00
OUTFLOW	0.00	23.00	47.00	72.00	90.00	110.00	1780.00	5090.00
STAGE	413.00	415.00	416.00	417.00	418.00	419.00	420.00	421.00
FLOW	0.00	23.00	47.00	72.00	90.00	110.00	1780.00	5090.00

MAXIMUM STAGE IS 419.1

MAXIMUM STAGE IS 419.2

MAXIMUM STAGE IS 419.3

MAXIMUM STAGE IS 419.4

MAXIMUM STAGE IS 419.5

MAXIMUM STAGE IS 419.7

MAXIMUM STAGE IS 419.9

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HYDROGRAPH ROUTING

ROUTE TO RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
401	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0700	0.0350	0.0700	352.0	365.0	16800.	0.0040

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 365.00 150.00 360.00 188.00 356.00 200.00 352.00 215.00 352.00
227.00 356.00 260.00 360.00 300.00 365.00

STORAGE	0.00	4.50	10.08	16.75	24.50	33.33	43.27	55.66	71.25
	112.05	137.25	165.67	197.32	232.22	270.37	311.77	356.42	404.32
OUTFLOW	0.00	22.44	75.25	156.74	268.42	412.36	597.04	856.19	1163.51
	1941.66	2421.09	2965.24	3577.81	4262.70	5023.31	5862.97	6784.92	7792.32
STAGE	352.00	352.68	353.37	354.05	354.74	355.42	356.11	356.79	357.47
	358.84	359.53	360.21	360.89	361.58	362.26	362.95	363.63	364.32
FLOW	0.00	22.44	75.25	156.74	268.42	412.36	597.04	856.19	1163.51
	1941.66	2421.09	2965.24	3577.81	4262.70	5023.31	5862.97	6784.92	7792.32

MAXIMUM STAGE IS 354.5

MAXIMUM STAGE IS 355.3

MAXIMUM STAGE IS 355.9

MAXIMUM STAGE IS 356.3

MAXIMUM STAGE IS 356.7

MAXIMUM STAGE IS 357.3

MAXIMUM STAGE IS 357.9

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
400	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.97	0.00	4.24	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	117.00	127.00	141.00	151.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LKOPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.04

UNIT HYDROGRAPH DATA
TP= 3.10 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 100 END-OF-PERIOD ORDINATES, LAG= 3.09 HOURS, CP= 0.63 VOL= 0.99

3.	13.	26.	42.	59.	78.	98.	119.	141.	163.
185.	205.	222.	236.	246.	257.	263.	265.	265.	261.
253.	236.	223.	211.	199.	188.	177.	167.	156.	149.
141.	133.	125.	118.	112.	105.	99.	94.	89.	84.
79.	75.	70.	66.	63.	59.	56.	53.	50.	47.
44.	42.	40.	37.	35.	33.	31.	30.	28.	26.
25.	24.	22.	21.	20.	19.	18.	17.	16.	15.
14.	13.	12.	12.	11.	10.	10.	9.	9.	8.
8.	7.	7.	7.	6.	6.	6.	5.	5.	5.
4.	4.	4.	4.	4.	3.	3.	3.	3.	3.

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	25.97	22.38	3.60	160733.
										(660.)	(568.)	(91.)	(4551.45)

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COMBINE HYDROGRAPHS

COMBINE 3 HYDROGRAPHS TOTAL RESERVOIR INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
400	3	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

ROUTE THRU RESERVOIR AND OVER SPILLWAY

ISTAQ	ICOPP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
400	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-352.	0

CAPACITY=	0.	120.	130.	148.	170.	192.	213.	235.
ELEVATION=	337.	352.	352.	353.	354.	355.	356.	357.

CREL	SPWID	COGW	EXPW	ELEVL	COGL	CAREA	EXPL
351.5	426.0	2.9	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COGD	EXPD	DAMWID
357.0	2.6	1.5	300.

PEAK OUTFLOW IS 1752. AT TIME 42.33 HOURS

PEAK OUTFLOW IS 2578. AT TIME 42.17 HOURS

PEAK OUTFLOW IS 3376. AT TIME 42.17 HOURS

PEAK OUTFLOW IS 4153. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 5213. AT TIME 42.67 HOURS

PEAK OUTFLOW IS 7418. AT TIME 42.33 HOURS

PEAK OUTFLOW IS 9464. AT TIME 42.17 HOURS

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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0.20	RATIO 2 0.30	RATIO 3 0.40	RATIO 4 0.50	RATIO 5 0.60	RATIO 6 0.80	RATIO 7 1.00
HYDROGRAPH AT	100	1.07	1	591.	886.	1182.	1477.	1773.	2365.	2954.
		(2.76)	(	16.73)(	25.10)(	33.46)(	41.83)(	50.19)(	66.92)(	83.65)(
ROUTED TO	101	1.07	1	591.	881.	1174.	1500.	1804.	2367.	2955.
		(2.76)	(	16.74)(	24.94)(	33.24)(	42.48)(	51.07)(	67.02)(	83.67)(
ROUTED TO	41	1.07	1	590.	880.	1173.	1480.	1777.	2365.	2956.
		(2.76)	(	16.70)(	24.92)(	33.22)(	41.92)(	50.31)(	66.96)(	83.72)(
HYDROGRAPH AT	200	0.73	1	384.	577.	769.	961.	1153.	1537.	1922.
		(1.88)	(	10.88)(	16.33)(	21.77)(	27.21)(	32.65)(	43.54)(	54.42)(
ROUTED TO	201	0.73	1	232.	248.	266.	606.	876.	1337.	1760.
		(1.88)	(	6.58)(	7.03)(	7.54)(	17.16)(	24.80)(	37.87)(	49.85)(
ROUTED TO	41	0.73	1	232.	248.	266.	605.	876.	1338.	1758.
		(1.88)	(	6.58)(	7.03)(	7.54)(	17.14)(	24.81)(	37.90)(	49.78)(
2 COMBINED	41	1.79	1	783.	1115.	1417.	1730.	2238.	3434.	4519.
		(4.64)	(	22.19)(	31.58)(	40.12)(	48.99)(	63.39)(	97.23)(	127.96)(
ROUTED TO	41	1.79	1	773.	1099.	1394.	1693.	2200.	3368.	4428.
		(4.64)	(	21.90)(	31.12)(	39.49)(	47.93)(	62.31)(	95.38)(	125.38)(
HYDROGRAPH AT	300	0.48	1	312.	469.	625.	781.	937.	1250.	1562.
		(1.24)	(	8.85)(	13.27)(	17.69)(	22.12)(	26.54)(	35.39)(	44.23)(
ROUTED TO	301	0.48	1	310.	465.	620.	776.	931.	1241.	1551.
		(1.24)	(	8.78)(	13.18)(	17.57)(	21.96)(	26.35)(	35.14)(	43.92)(
ROUTED TO	401	0.48	1	230.	384.	533.	679.	823.	1098.	1370.
		(1.24)	(	6.52)(	10.87)(	15.06)(	19.23)(	23.29)(	31.10)(	38.80)(
HYDROGRAPH AT	400	1.97	1	786.	1179.	1572.	1966.	2359.	3145.	3931.
		(5.10)	(	22.26)(	33.39)(	44.53)(	55.66)(	66.79)(	89.05)(	111.32)(
3 COMBINED	400	4.24	1	1756.	2542.	3383.	4157.	5222.	7467.	9468.
		(10.98)	(	49.71)(	71.99)(	95.79)(	117.71)(	147.87)(	211.41)(	268.11)(

ROUTED TO	400	4.24 (10.98)	1	1752. (49.62)	2578. (72.99)	3376. (95.60)	4153. (117.61)	5213. (147.60)	7418. 210.(6)	9464. (267.98)

PLAN 1 STATION 101

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	591.	417.6	41.33
0.30	881.	422.6	41.33
0.40	1174.	429.7	41.33
0.50	1500.	432.1	41.17
0.60	1804.	432.2	41.17
0.80	2367.	432.5	41.33
1.00	2955.	432.8	41.17

PLAN 1 STATION 410

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	590.	400.7	41.33
0.30	880.	401.4	41.50
0.40	1173.	402.0	41.50
0.50	1480.	402.6	41.33
0.60	1777.	403.1	41.33
0.80	2365.	403.8	41.33
1.00	2956.	404.5	41.33

PLAN 1 STATION 201

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	232.	424.5	43.33
0.30	248.	427.6	44.17
0.40	266.	431.2	44.50
0.50	606.	432.1	43.33
0.60	876.	432.2	42.83
0.80	1337.	432.3	42.17
1.00	1760.	432.5	42.00

PLAN 1 STATION 41[illegible]

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
[illegible].20	232.	399.1	43.5[illegible]
0.30	248.	399.1	44.17

0.40	266.	399.2	44.50
0.50	605.	400.4	43.33
0.60	876.	401.1	42.83
0.80	1336.	401.9	42.33
1.00	1758.	402.5	42.00

PLAN 1 STATION 413

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	773.	356.3	41.83
0.30	1099.	357.0	41.67
0.40	1394.	357.5	41.67
0.50	1693.	358.0	41.67
0.60	2200.	358.7	42.67
0.80	3368.	360.1	42.17
1.00	4428.	361.1	42.00

PLAN 1 STATION 301

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	310.	419.1	40.83
0.30	465.	419.2	40.83
0.40	620.	419.3	40.83
0.50	776.	419.4	40.83
0.60	931.	419.5	40.83
0.80	1241.	419.7	40.83
1.00	1551.	419.9	40.83

PLAN 1 STATION 401

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	230.	354.5	42.00
0.30	384.	355.3	41.67
0.40	533.	355.9	41.5[illegible]
0.50	679.	356.3	41.50
0.60	823.	356.7	41.50
0.80	1098.	357.3	41.33
1.00	1370.	357.9	41.5[illegible]

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	351.50	351.50	357.00
STORAGE	120.	120.	235.
OUTFLOW	0.	0.	16210.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	352.75	0.00	143.	1752.	0.00	42.33	0.00
0.30	353.11	0.00	151.	2578.	0.00	42.17	0.00
0.40	353.43	0.00	158.	3376.	0.00	42.17	0.00
0.50	353.72	0.00	164.	4153.	0.00	42.00	0.00
0.60	354.08	0.00	172.	5213.	0.00	42.67	0.00
0.80	354.77	0.00	187.	7418.	0.00	42.33	0.00
1.00	355.34	0.00	199.	9464.	0.00	42.17	0.00

APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

1. Department of the Army, Office of the Chief of Engineers. National Program of Investigation of Dams; Appendix D: Recommended Guidelines for Safety Inspection of Dams, 1976

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6. The Hydrologic Engineering Center: Computer Program 723-X6-L2010, HEC-1 Flood Hydrograph Package, User's Manual, Corps of Engineers, U.S. Army, 609 Second Street, Davis, California 95616, January 1973

7. The Hydrologic Engineering Center, Computer Program: Flood Hydrograph Package (HEC-1) Users Manual For Dam Safety

8. Soil Conservation Service (Engineering Division): Urban Hydrology for Small Watersheds, Technical Release No. 55, U.S. Department of Agriculture, January 1975

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12. J.T. Riedel, J.F. Appleby and R.W. Schloemer: Hydrometeorological Report No. 33, U.S. Department of Commerce, U.S. Department of Army, Corps of Engineers, Washington, D.C., April 1956. Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

13. North Atlantic Regional Water Resources Study Coordinating Committee: Appendix C, Climate, Meteorology and Hydrology, February 1972

14. Sherard, Woodward, Gizienski, Clevenger: Earth and Earth - Rock Dams, John Wiley and Sons, Inc., 1963

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16. The University of the State of New York - The State Education Department, State Museum and Science Service, Geological Survey: Geologic Map of New York, 1970

17. C.A. Hartnagel, 1907, Geologic Map of the Rochester and Ontario Beach Quadrangles, New York State Museum Bulletin 114

18. Soil Survey of Monroe County, New York, 1977, United States Department of Agriculture, Soil Conservation Service

19. Guidebook for Field Trips in Wester New York, 1956, New York State Geological Association 28th Annual Meeting at the University of Rochester, N.Y.

20. Erdman, Anthony, Associates: Detailed Drainage Study, Round Pond Watershed, Town of Greece, New York, June 1976

APPENDIX E

PREVIOUS INSPECTION REPORTS/AVAILABLE DOCUMENTS

TOWN of GREECE

2505 WEST RIDGE ROAD
ROCHESTER, NEW YORK, 14626 • 716-225-2000

March 6, 1980

Kenneth D. Harmer
Dam Safety Coordinator
New York State Department
of Environmental Conservation
50 Wolf Road
Albany, New York 12233

ATTN: Boyd Kaler

RE: English Road Flood Control Facility
DEC Dam No. 40A-4294

Gentlemen:

The following information is provided per your request of February 26, 1980. Please be advised that the above structure was completed in June of 1978 and has been in service since that time.

Thank you for your interest.

Very truly yours,

James S. Peet, P.E.
Town Engineer

JSP:rm

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Robert F. Flacke
Commissioner

February 26, 1980

Town of Greece
2505 Ridge Road West
Rochester, New York 14626

Re: Dam No. 40A-4294
Watershed Western Lake Ontario
Township Greece
County Monroe

Dear Sir:

The Dam Safety Section is involved in maintaining up-to-date files on dams in New York State. Therefore, would you please fill in the following information and return to this office:

Has Dam No. 40A-4294 located at South of English Road, been built?

If not, do you intend to construct the dam?

On what date will construction be complete?

Thank you for your time and cooperation.

Very truly yours,

Kenneth D Harmer

Kenneth D. Harmer
Dam Safety Coordinator

By: Boyd Kaler
Principal Engineering Technician

B. Kaler

APPLICATION FOR PERMIT

for the Construction, Reconstruction or Repair of a Dam or Other Impoundment Structure under Conservation Law, Section 429 (c).

Dam No. 40A-4274
Watershed W. LK ONTARIO - Genesee

Instructions on the reverse side before completing this application. Please type or print clearly in ink.

1. NAME AND ADDRESS OF APPLICANT
First Name: — M.I.: — Last Name: — Phone No.:
TOWN OF GREECE
Street Address: 2505 RIDGE ROAD WEST
Post Office: ROCHESTER State: NEW YORK Zip Code: 14626

2. NAME AND ADDRESS OF OWNER (If different from applicant)
First Name: — M.I.: — Last Name:
Street Address:
Post Office: — State: — Zip Code:

3. PROJECT: ☐ Construction ☐ Reconstruction ☐ Repair

4. IS STATE-OWNED LAND TO BE USED? ☒ Yes ☐ No

5. PROPOSED STARTING DATE: August 1977

EXPECTED COMPLETION DATE: June 1978

DESCRIPTION

LOCATION OF DAM

Name of Body of Water: Paddy Hill Creek
County: Monroe
Town: Greece
Give distance and direction from commonly accepted landmark: 1000' South of English Road

LOCATION ON U.S. GEOLOGICAL SURVEY MAP
Name of Map: Rochester West
Latitude: 43°14'
Longitude: 77°40'

6. PROPOSED USE FOR IMPOUNDED WATER: Temporary flood storage

9. STATE THE HEIGHT ABOVE SPILLCREST OF THE LOWEST PART OF THE IMMEDIATE UPSTREAM ADJOINING PROPERTY OR PROPERTIES: 1.5 Feet

7. IS PROPOSED POND OR LAKE PART OF A PUBLIC WATER SUPPLY? ☐ Yes ☒ No
Where is nearest downstream public water supply intake? City Water Intake on Lake Ontario

11. SIZE OF AREA DRAINING INTO POND OR LAKE (Acres or Square Miles): 3233 acres

DRAINAGE AREA IS COMPOSED OF: (Total = 100%) 20% commercial - industrial
0 % Forest 0 % Cropland 0 % Pasture 20 % Other 0 % Swamp 80 % Suburban Lands 0 % Urban Lands

12. SPILLWAY
☐ Service Spillway — Auxiliary Spillway Combination
☐ Single Spillway
☐ Pipe Riser ONLY
☐ Other

14. DESIGNER'S ESTIMATE OF CLASS OF HAZARD (As described in "Guidelines for Small Earth Dam Designs").
☐ Class "a" ☐ Class "b" ☒ Class "c"
NOTE: Provide descriptive information on character of downstream area.

15a. ~~SINGLE SPILLWAY OR~~ AUXILIARY INFLOW DESIGN FLOOD
Frequency 100 MFF Flood Peak 9200 c.f.s. Runoff Volume 10 In.

15b. SERVICE SPILLWAY INFLOW DESIGN FLOOD
Frequency 50 Flood Peak 1357 c.f.s. Runoff Volume 2.6 In.

~~SINGLE SPILLWAY OR~~ AUXILIARY SPILLWAY IS COMPOSED OF:
☐ Excavated Earth ☐ Concrete ☐ Timber ☐ Rock-filled Crib ☐ Masonry ☒ Other Stone lined

17. ~~SINGLE~~ AUXILIARY SPILLWAY VELOCITY WITHIN THE ~~SINGLE~~ AUXILIARY SPILLWAY 14.5 f.p.s.

18. ~~SINGLE OR~~ AUXILIARY SPILLWAY DISCHARGE AT DESIGN HIGH WATER 8500 c.f.s.

19. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY
☒ Hydraulic Jump Basin ☐ Drop Structure ☐ Other

HOW LAKE WILL BE DRAINED BY MEANS OF: Service Spillway

WATER WILL BE SUPPLIED TO RIPARIAN OWNERS DOWNSTREAM BY MEANS OF: Service Spillway

HEIGHT OF DAM ABOVE STREAM BED: 21 Feet

CAPACITY DATA (Items 1, 2 and 3, OR 1, 2, 4, 5)

	ELEVATION, Referred To Assumed Benchmark	SURFACE AREA	VOLUME STORED
Top of Dam	357.0 Feet	22 Acres	235 Acre-Feet
Maximum High Water	355.0 Feet	21 Acres	190 Acre-Feet
Single Spillway Crest	N/A Feet	N/A Acres	N/A Acre-Feet
Auxiliary Spillway Crest	351.5 Feet	18.6 Acres	120 Acre-Feet
Service Spillway Crest	336.5 Feet	0 Acres	0 Acre-Feet

20. ENERGY DISSIPATER AT OUTLET OF CONDUIT:
☐ Impact Basin ☐ Plunge Pool ☐ Hydraulic Jump Basin ☒ Other Stone lined channel

IS PIPE RISER PROVIDED WITH AN ANTI-VORTEX DEVICE? ☐ Yes ☐ No N/A

DRAWDOWN TIMES: Answer 1 and 2, or 1, 3 and 4

1. Provision been made to evacuate 90% of the storage below the lowest spillway crest within fourteen days? ☒ Yes ☐ No
2. Can single spillway evacuate 75% of the storage between the maximum design high water and the spillway crest within 48 hours? ☐ Yes ☐ No
3. Can Service Spillway evacuate 75% of the storage between the auxiliary spillway and the Service Spillway crests within seven days? ☒ Yes ☐ No
4. Can Service Spillway and the Auxiliary Spillway in combination evacuate the storage between the design high water and the auxiliary spillway crest in 12 hours? ☒ Yes ☐ No

(over)

Soils over rock are primary medium to give some with ... deposits of glacial till and glacial wash. Rock is layered shales and siltstones, top 1' usually weathered and rippable

If an earth dam, describe the material to be used in the embankment. Gradation of embankment material is specified in contract documents.

What is the source of embankment fill material(s)? Contractor to provide borrow source to be tested by Engineer

Were there porous seams or fissures beneath the foundation of the proposed dam? ☐ Yes ☒ No | Method used to obtain the above soil data: ☒ Soil borings ☒ Test Pits

DESIGN ENGINEER		26. CONSTRUCTION ENGINEER OR CONTRACTOR	
Name of Agency or Individual	P.E. License No. of Individual	Name of Agency or Individual	P.E. License No. of Individual
Erdman, Anthony, Assoc.	40155 45083	(Public bid)	
Address		Address	
242 Andrews St, Rochester, NY 14604			
Title		Title	

NAME AND ADDRESS OF OFFICIAL NEWSPAPER OF LOCALITY WHERE PROPOSED WORKS ARE LOCATED

Greece Post, P.O. Box 2829, Rochester, N.Y. 14626

CERTIFICATION

Application is hereby made to the Conservation Department acting in behalf of the Water Resources Commission pursuant to Sections 429(c) of the Conservation Law.

The applicant certifies that the above statements are true and agrees that the issuance of the permit is based on the accuracy thereof. As a condition to the issuance of a permit, the applicant accepts full legal responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.

July 12, 1977
Date

Signature

INSTRUCTIONS

1. Type or print in INK.
2. Five (5) copies of all papers including detail construction plans and specifications must be filed.
3. The plans and specifications submitted with the application must include the following information:
   (a) A plan showing proposed dam, dam appurtenances, bench marks, topographic contours at dam and around the anticipated reservoir area, including 2-foot contours to 6 feet above high water level.
   (b) A profile along the dam axis and a transverse section of the dam at its maximum height.
   (c) A profile along the center line and transverse section, or sections, of the spillways including stilling basins, outlet work, and other details, if necessary, in design of the structures.
   (d) A topographical plan to a suitable scale showing drainage area, normal water level in the lake or pond and owners property line metes and bounds.
   (e) Specifications for materials and methods of construction.
   (f) A log of all soil information available to the design engineer or conservationist and location of drill holes, test pits or other foundation exploration, location of borrow area, horizontal and vertical controls, if necessary.
   (g) Additional drawings should be included to clearly show all details of the proposed works.
4. NO WORK of construction, reconstruction or repairs of the structure or structures SHALL BE STARTED UNTIL A PERMIT therefor has been issued by the New York State Water Resources Commission.
5. The design, preparation of plans, estimates and specifications and the supervision of the construction, reconstruction and repair of all the structures herein applied for shall be done by a licensed professional engineer except in the case of farm ponds by an engineer or conservationist employed by a governmental agency cooperating with the conservation district, or by an engineer employed by the Department of Environmental Conservation.
6. A "Notice of Application" must be published by the applicant. The form of notice and instructions for publication will be furnished to the applicant by the Local Permit Agent to whom the application is addressed.
7. An information circular "Guidelines for Soil Earth Dam Designs" is available upon request from the Water Resources Commission or the Local Permit Agent.
8. Samples of foundation materials and construction materials need not be furnished unless requested.

L. Concra/S. Zeccolo
Wm. Righter/G. Koch
Proposed English Road Detention Facility - Town of Greece
Application No. 828-77-1212
August 8, 1977

Reference is made to the letter of August 5, 1977 from the Engineer which was addressed to G. Koch. Included with the letter are the revised drawings S-1, S-3, and S-7 for the energy dissipator at the outlet of the pipe spillway. We have reviewed the drawings and they are satisfactory. The revisions shown on the drawings will be implemented by providing a field change to the present contract.

ERDMAN, ANTHONY, ASSOCIATES

CONSULTING ENGINEERS & PLANNERS

P. O. BOX 9589 • 242 ANDREWS STREET
ROCHESTER, NEW YORK 14604
(716) 325-1866

PAUL B ERDMAN, P.E.
EDWIN L. ANTHONY, P.E., L.S.

ALFRED F. LYNG, P.E.

A. J. BEDARD, JR., P.E.
D. J. BERGMANN, P.E.
R. M. GOSS, P.E.
K. KETCHEK, P.E.
F. J. McSHEA, P.E., L.S.
G. R. SMELTZ, P.E.
E. C. TONIAS, P.E.
P. TREER, P.E.
D. C. TUTTLE, P.E., L.S.
R. B. ULP, P.E.

August 5, 1977

New York State Department
of Environmental Conservation
50 Wolfe Road
Albany, N.Y. 12233

Attn: Mr. George Koch

Re: English Road Dentention Facility
Town of Greece, N.Y.

Dear Mr. Koch,

Attached please find 3 copies of Drawings S-1, S-3 and S-7 of the above referenced project. In these drawings we have incorporated the energy decipator apron and splash blocks as agreed upon by our telephone conversation of 28 July 1977. It is our understanding that this change fullfills the requirements of your office for the review of this project.

Should you have any questions please contact us. We wish to express our sincere appreciation for all consideration given us and we apologize for the short time given you for review.

Again we many thanks.

Very truly yours,

ERDMAN, ANTHONY, ASSOCIATES

Elias C. Tonias

Elias C. Tonias, P.E.
Associate

2-6218 Encl.

cc: S. Zeccolo, NYSDEC, Albany w/o enclosure
G. Penzimer, Town of Greece w/enclosure
E. Wagner, NYSDEC, Avon w/enclosure

ERDMAN, ANTHONY, ASSOCIATES

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P. TREER, P.E.
D. C. TUTTLE, P.E., L.S.
R. B. ULP, P.E.

July 29, 1977

New York State Department of
Environmental Conservation
50 Wolf Road
Albany, New York 12233

Attn: Mr. George Koch

Re: English Road Detention Facility
Town of Greece, N.Y.

Dear Mr. Koch:

This letter is written in regards to the design review meeting of July 26, 1977 attended by Gene Penzimer and James Peet (Town of Greece), Elias Tonias and Ken Allen (Erdman, Anthony, Associates), and yourself. We would like to respond to matters discussed at that meeting and noted in your interoffice memorandum dated July 22, 1977, as follows:

1. Service Spillway Channel Protection

We have reviewed the manual provided by your office entitled "Model Studies of Culvert Outlet Structures" prepared by the California Department of Water Resources. We would prefer not to utilize a structure of this nature in the English Road project for the following reasons:

a. Increased height or provision of overhangs on the concrete walls could be required to control the secondary flow patterns, as noted on page 16 of the manual.

b. A concrete apron would appear to be necessary downstream of the structure to handle the impact of flows in the intermediate range which strike the reverse portion of the outlet and flip upward, as noted on page 14 of the manual.

c. The jump in water surface downstream of the structure would overtop the banks of the channel in an erratic pattern.

d. The structure does not appear to be effective in reducing velocities for lower flow rates which occur more frequently, as noted on Figure 22 of the manual.

e. The model tests do not provide specific design recommendations for control of secondary flow patterns, protection of downstream bed from impact forces, etc.

The concept which we have proposed for protection of the auxiliary spillway is considered to be a sound one. However we are conscious of your concerns about the outflow velocity. Therefore we suggest that a greater degree of conservation could be provided reasonably at this point by adding an 8' wide x 20' long concrete apron with impact blocks on the channel bottom downstream of the culvert outlet, with the upstream end tied to the headwall and the downstream end extending to sound rock. If this change meets with the approval of the Department, it will be designed in detail and provided under contract as a field change. Detailed drawings will be provided to the Department under separate cover.

2. Auxiliary Spillway

The auxiliary spillway has been designed for standard project flood peak discharge, with no reduction in peak due to storage at this facility, or at any point upstream. As such, a highly conservative design in the stone protection is not considered to be necessary. The stone selected is considered to be adequate for standard project flood flows based on data from Bureau of Public Roads HEC number 11. A check was made of overflow velocities for storms less than standard project flood and the results were as follows:

Frequency	Aux. Spillway Velocity
100 year	3.2 FPS
1000 year	7.5 FPS

Every reasonable precaution has been taken to ensure the integrity of the auxiliary spillway stone by the provision of the concrete retaining walls and the liner material anchored continuously to the wall footings.

With regards to the length of the walls in the hydraulic jump area, the computed length of the jump was found to be 15.7' if the jump were occurring on a smooth concrete apron. Due to the roughness of the heavy stone, the jump length would be somewhat less than the computed length. In that the froude number was in a low, stable range and the design was for standard project flood, the provision of 12' of retaining walls was considered to be adequate.

We request that you consider the information thus provided and we thank you for your thorough review of the project. If any additional information is required by the Department prior to granting of the permit, please call us.

The loan copy of the Model Studies Report has been enclosed herewith.

Very truly yours,

ERDMAN, ANTHONY, ASSOCIATES

Kenneth Allen, P.E.

1-5182.03
Enclosure
cc: G. Penzimer (w/o encl.)

KA/sml

L. Concra/B. Zeccolo - Environ. Analysis
Wm. Righter/G. Koch - PACE
Proposed English Road Detention Facility
Town of Greece, Appl. No. 828-77-1212

July 22, 1977

We have reviewed the Hydrology and Hydraulics for the above structure and have the following comments;

Service Spillway

A concrete structure is required at the outlet of the 84-inch diameter RCP.

Auxiliary Spillway

For the stone protection in the spillway channel the engineer indicates that an average stone diameter of 1.9 feet is required to withstand the velocities. Criteria developed by the Corps of Engineers and the Bureau of Reclamation indicate that the stone diameter for the channel velocity should be 2.5 feet.

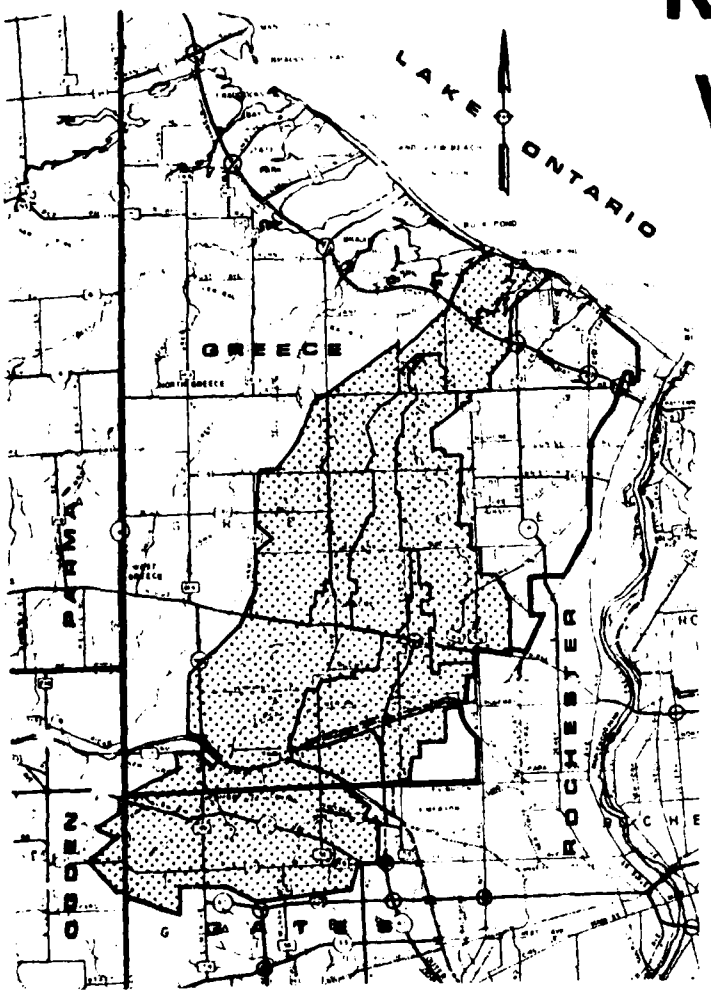
The depth of stone is not large enough. The depth should be at least 1.5 times the average stone diameter.

The walls at the basin should be extended to cover the full length of the hydraulic jump.

Meeting

A meeting has been scheduled for Tuesday July 26, 1976 at 11:00 A.M. on Wolf Road, Albany to discuss our comments with the engineer. Jim Peet and Ken Allen will be there.

TOWN OF GREECE
COUNTY OF MONROE
NEW YORK



ROUND POND WATERSHED

DETAILED DRAINAGE STUDY

VOLUME I REPORT

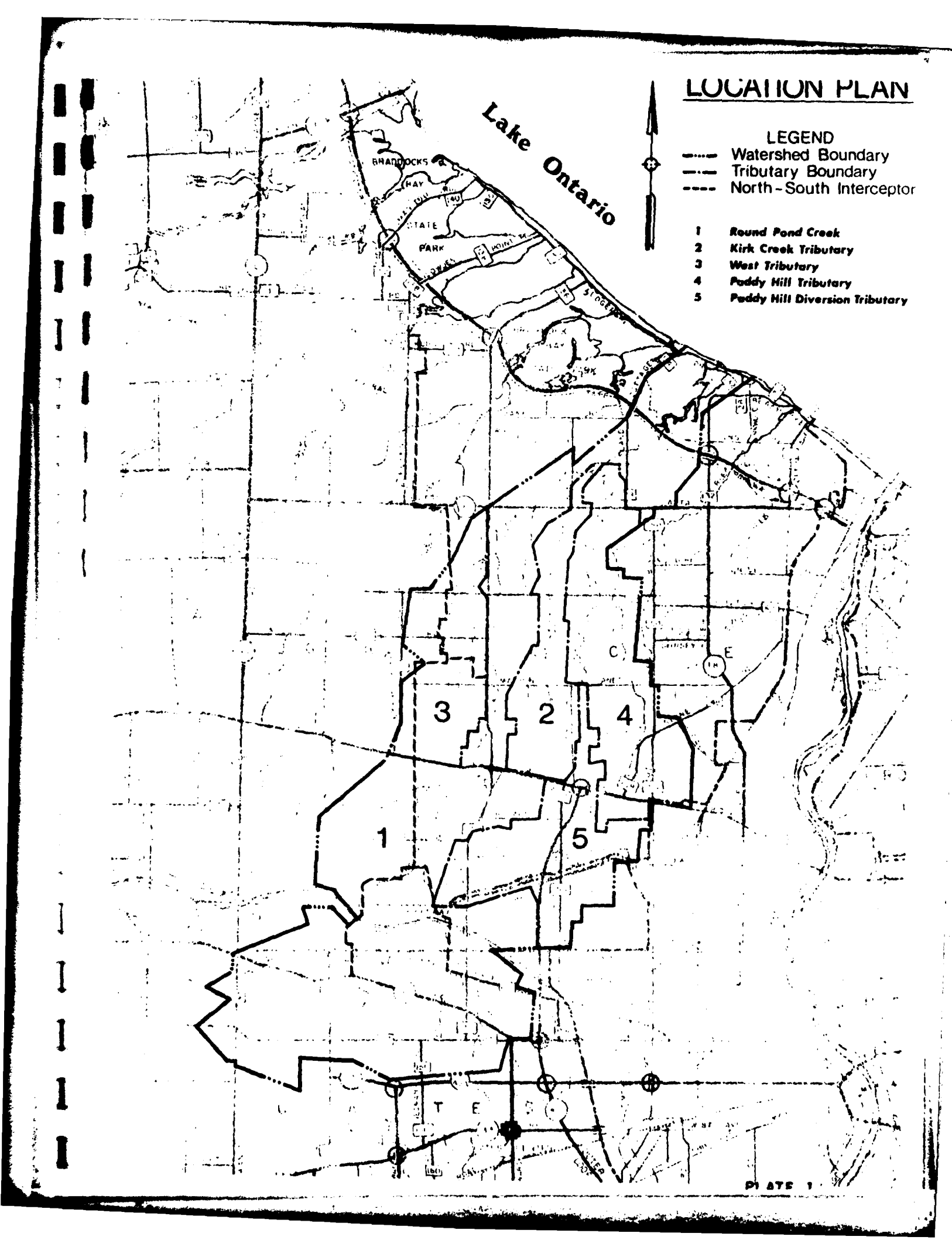
JUNE 1976

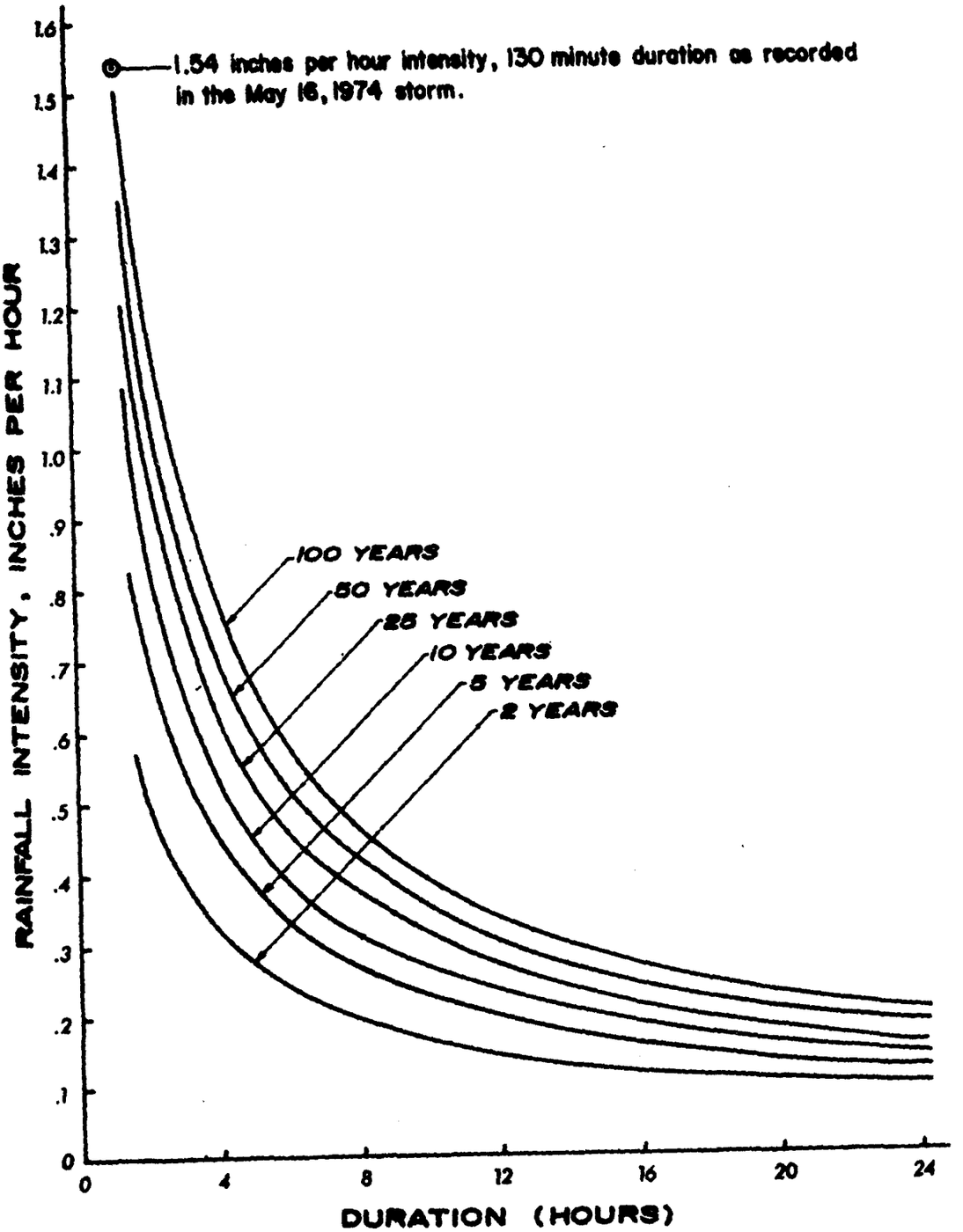
Rev. 11-19-76

ERDMAN, ANTHONY, ASSOCIATES

Consulting Engineers and Planners

Rochester, N.Y. **Camp Hill Pa.**


LOCATION PLAN
LEGEND
Watershed Boundary
Tributary Boundary
North - South Interceptor
1 Round Pond Creek
2 Kirk Creek Tributary
3 West Tributary
4 Paddy Hill Tributary
5 Paddy Hill Diversion Tributary
Lake Ontario
BRANDOCKS BAY
STATE PARK
POINT
1
2
3
4
5
PLATE 1



RAINFALL INTENSITY CURVES
for
MONROE COUNTY, NEW YORK

Plate IV

TABLE I

EXISTING CHANNEL SLOPES

Stream	Reach	Slope, %
Round Pond Creek	Town Line to Ridgeway Ave.	1.20
	Ridgeway Ave. to Doe Run	0.60
	Doe Run to Ridge Road	0.18
	Ridge Rd. to Long Pond Rd.	0.75
	Long Pond Rd. to Mill Rd.	0.52
	Mill Rd. to English Rd.	1.00
	English Rd. to Latta Rd.	0.48
	Latta Rd. to Penn Central Railway	0.64
	Penn Central Railway to Parkway	0.24
	Parkway to Lake Ontario	0.04
Kirk Creek	Maiden Lane to 1700' south of English Road	0.73
	1700' south of English Road to 1300' north of English Rd.	1.15
	1300' north of English Rd. to Latta Road	0.55
	Latta Road to Jonathan Drive	1.58
	Jonathan Drive to confluence with Round Pond Creek	0.67
Paddy Hill Creek	Stone Ridge Dr. to Marblehead Dr.	0.21
	Marblehead Dr. to English Rd.	0.44
	English Rd. to confluence with Round Pond Creek	0.72
Paddy Hill Creek Diversion	Ridge Rd. to 400' south of Maiden Lane	0.43
West Tributary	Maiden Lane to Mill Road	0.42
	Mill Road to English Road	1.20
	English Rd. to Round Pond Creek Confluence	0.57

PADDY HILL CREEK (0-121-1)

C.P. No.	LOCATION	DRAINAGE AREA IN ACRES	STRUCTURE DESCRIPTION	EXIST INVERTS	FLOW IN C.F.S.				
					Nom. Cap.	Q10	Q25	Q50	Q100
42	Hoover Road	25	3'x 2.5' Conc. Box		60	9	11	13	15
43	Ridge Road	92	48" RCP		100	33	40	48	54
43A	Imperial Manor Apts.	155	60" CMP	395.8 395.3	80	55	66	80	90
44	Stone Ridge Drive	199	48" RCP	393.7 393.1	60	71	84	102	116
45	Marron Drive	379	103x71 CSPA	384.1 384.0	200	132	156	192	219
47	Maiden Lane	739	14.0'x 6.25' Conc. Bridge	376.5 376.3	700	240	288	356	408
47A	Heritage Drive	815	13.05'x 7.05' Conc. Bridge	374.0 374.6	600	261	317	394	450
48	Marblehead Drive	850	14'x 6' Box Culv.	367.3 367.0	600	273	332	412	472
49	Confluence	1030	None			327	410	494	563
49	Combined (0-121-1') Paddy Hill Diversion	2604	None			700	870	1040	1185
50A	Future Dorsey Road W/ Kirk Cr. Div.	2733/3071	None			705 800	880 1005	1060 1225	1210 1405
51	Greece Town Park	2895/3233	Proposed detention			840 505	1055 595	1290 675	1475 900
53	English Road	3045/3383	14'x5' Conc. Bridge	325.7 325.2	700	520	610	700	925

PADDY HILL CREEK (0-121-1)

C.P. No.	LOCATION	DRAINAGE AREA IN ACRES	STRUCTURE DESCRIPTION	EXIST INVERTS	FLOW IN C.F.S.				
					Nom. Cap.	Q10	Q25	Q50	Q100
53A	Everwild Lane	* 3085/3425	12'-10"x8'-4" CSSPPA, Headwall with wings both ends	315.0 314.5	800	531	608	709	925
55	Bridgewood Drive (So.)	3268/3608	12'-4"x 7'-9" CSSPPA	291.4 291.2	500	550	645	735	955
55A	Bridgewood Dr. (North)	3332/3672	12'-4"x 7'-9" CSSPPA	282.0 281.6	600	565	650	740	950
56	Latta Road	3430/3770	10.8'x 10.8' RC Box	279.5 278.0	1000	580	670	760	975
57	NYCRR	3556/3896	48" CIP		150	580	685	780	990
29	Confluence	3556/3896	None						
		PADDY HILL CREEK DIVERSION		(0-121-1')					
59	Weiland Road	165	60" CMP	437.0 436.5	150	54	69	84	94
60	Confluence (TRIB. 0-121-1'-2)	170	None			55	70	85	95
60	Combined	641	None			125	160	190	215
61	Latona Road	706	8' x 4' Conc. Box Culv.	427.6 427.3	350	140	175	210	235
64	Ridge Road	799	10'x6' Conc. Box Culv.	409.1 407.3	350	175	215	260	295
65	Confluence Tributary (0-121-1'-1)	817	None	397.0		180	220	265	300

PADDY HILL CREEK DIVERSION (0-121-1')

C.P. No.	LOCATION	DRAINAGE AREA IN ACRES	STRUCTURE DESCRIPTION	EXIST INVERTS	FLOW IN C.F.S.				
					Nom. Cap.	Q10	Q25	Q50	Q100
65	Combined	1509	None	397.0		360	140	525	595
67	Maiden Lane	1574	12'x 6' Box Culv.	374.3 373.6	1200	355	535	520	590
49	Confluence	1574	None			355	435	520	590
			TRIBUTARY (0-121-1'-1)						
37	Lee Road	205	24" CMP	508.1 506.4		75	95	115	130
38	Ridgeway Avenue	264	24" CMP to 18" CMP	505.3 504.1	20	100	120	145	160
40	Weiland Road	286	3'x 5' Conc. Culv.	436.5 436.2	80	104	130	155	175
41	Latona Road	378	8'x 4' Conc. Box Culv.	429.8	350	138	170	205	230
41A	Ridge Road	634	81"x 59" CMPA	414.0 402.0	350	165	200	235	265
65	Confluence	692	None	397.0		185	225	265	295

PADDY HILL CREEK DIVERSION (0-121-1')

C.P. No.	LOCATION	DRAINAGE AREA IN ACRES	STRUCTURE DESCRIPTION	EXIST INVERTS	FLOW IN C.F.S.				
					Nom. Cap.	Q10	Q25	Q50	Q100
			TRIBUTARY (0-121-1'-2)						
72	Hospital Pond Long Pond Road	179	24" x 38" Conc.	442.73	45	65 20	80 25	95 30	110 30
73	West of Sannita Drive	317	Proposal Detention			80	100	120	135
			42" CMP	433.60 433.43	60	35	40	55	65
73A	Sannita Drive West	367	48" CMP	433.41 433.38	80	45	55	60	65
73B	Sannita Drive East	449	6'x 3'-8" CMPA	430.93 430.06	100	75	90	105	115
60	Walkway Culv.	471	6'x 3' -8'CMPA	429.50 429.17	100	80	105	125	140
60	Confluence	471	None			80	105	125	140

ERDMAN, ANTHONY, ASSOCIATES

CONSULTING ENGINEERS & PLANNERS

PAUL B. ERDMAN, P.E.
EDWIN L. ANTHONY, P.E., L.S.
RICHARD B. ULP, P.E.

242 ANDREWS STREET P.O. BOX 9589
ROCHESTER, NEW YORK 14604
(716) 325-1866

ASSOCIATES
R. KETCHEK P.E.
D. C. TUTTLE P.E., L.S.
R. M. GOSS P.E.
P. THEER P.E.
C. W. CONDERMAN P.E.
P. C. KING JR. P.E.
J. PARSONS JR. P.E.

March 6, 1981

Mr. Jerry A. Gomez, P.E.
Stetson-Dale
105 Genesee Street
Utica, New York 13501

RECEIVED
MAR 10 1981
STETSON-DALE
BY

Dear Mr. Gomez:

Re: 1981 DAM INSPECTION
ENGLISH ROAD DETENTION FACILITY
TOWN OF GREECE, NEW YORK

Please find enclosed a copy of the design report for the above facility as per your letter of request dated February 11, 1981.

Section C - Geology, Section F - Contract Documents, and Section G - Operations and Maintenance have been omitted as your letter indicated that you already had this information. A copy of the drainage area map is enclosed with the report.

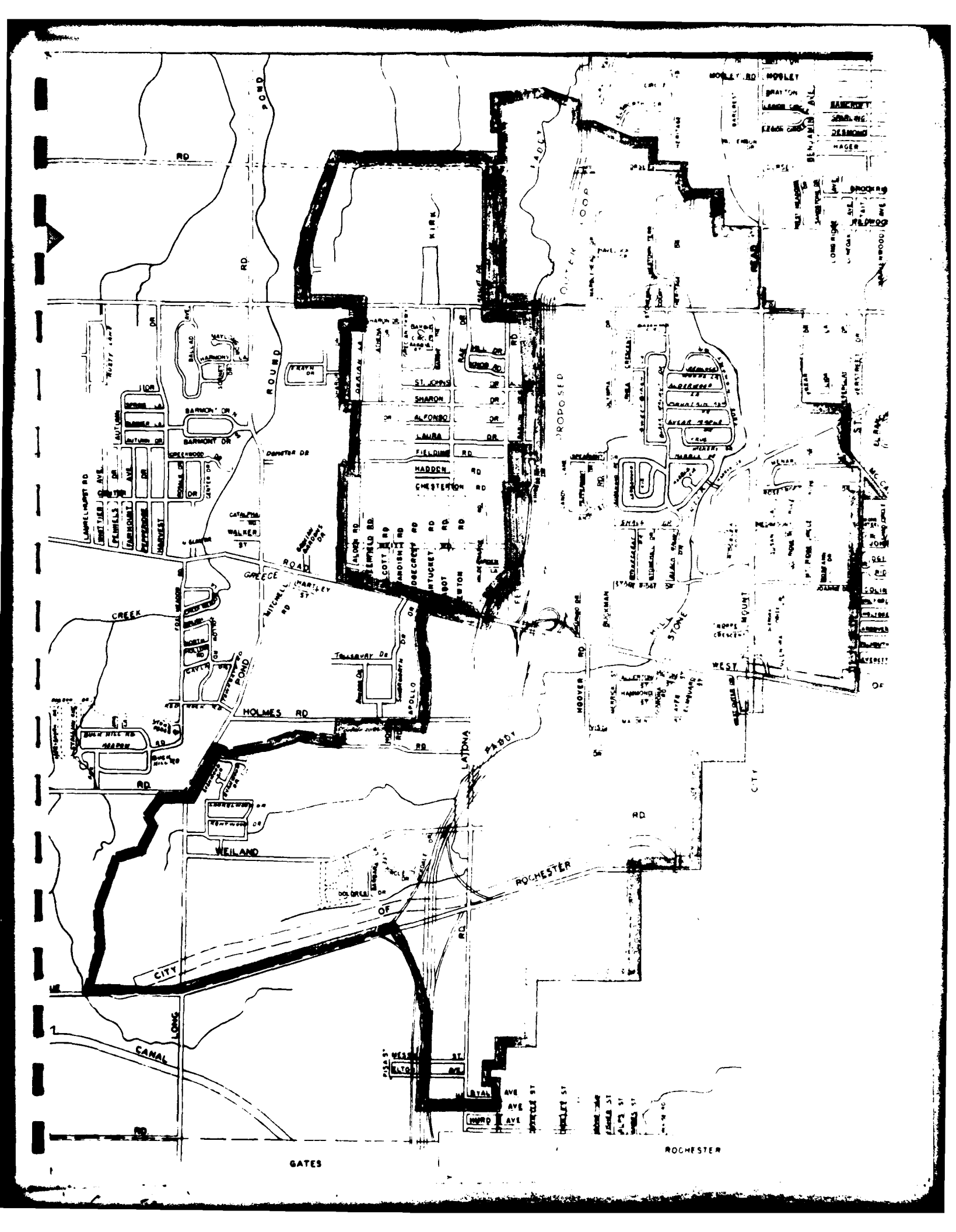
I have discussed this project with Mr. Carl Flexer of our office who was the resident engineer during construction. The construction records, including the gradation tests for the embankment have all been turned in to the Town of Greece. They would have to be obtained from Mr. James Peet, Town Engineer. Mr. Flexer assured me that the project was built in complete conformance to the design plans and that the erosion control membrane used under the rip-rap was as specified in the Contract Documents. The contractor requested no substitution on this project.

If you have any further questions, please feel free to contact me.

Very truly yours,
ERDMAN, ANTHONY, ASSOCIATES

PHILIP C. KING, P.E.
ASSOCIATE

PCK/vrm
1-2160
Encls.
F5


POND RD
ROUND
PROPOSED
ST. JOHNS
SHARON
ALFONSO
LAURA
FIELDING
HARDEN
CHESTERTON
BARMONT DR
BARMONY DR
GREECE
ROAD
CREEK
HOLMES RD
WEILAND
ROCHESTER
CITY
OF
CANAL
LONG
LATONA
HOOVER RD
MOUNT
HOPE
WEST
GATES
ROCHESTER

ENGLISH ROAD PARK
DETENTION FACILITY

Report On Design

July 1977

BY I DATE ERDMAN, ANTHONY, ASSOCIATES SHEET OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME

TABLE OF CONTENTS

AD-A105 819 STETSON-DALE UTICA NY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. ENGLISH ROAD DETENTION FACILITY DA--ETC(U)
JUN 81 J B STETSON DACW51-81-C-0009
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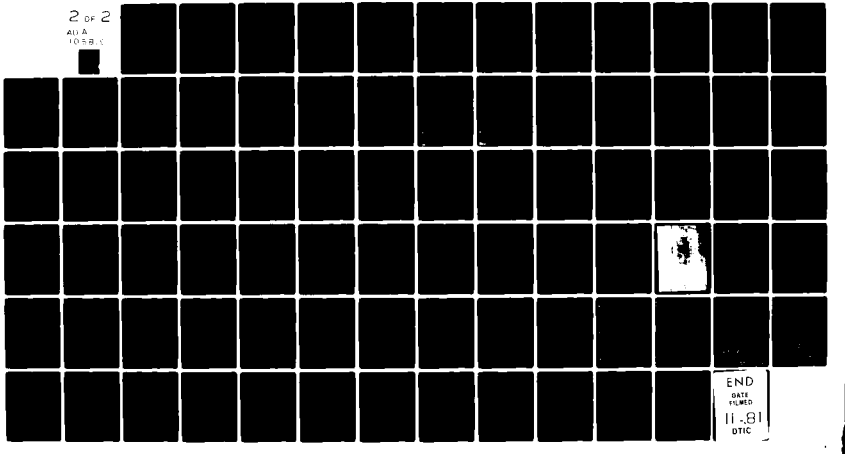

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11-81
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SECTION C - GEOLOGY

SECTION D - DESIGN COMPUTATIONS

SECTION E - CORRESPONDENCE

BY DATE ERDMAN, ANTHONY, ASSOCIATES SHEET OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME

SECTION F - CONTRACT DOCUMENTS

SECTION G - OPERATIONS AND MAINTENANCE REC.

BY WPA. DATE 6/29/77 ERDMAN, ANTHONY, ASSOCIATES SHEET OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME Eng. Rpt.

INTRODUCTORY REMARKS

1. Need for Project.

The combination of upstream development and construction of the diversion channel along Route 47 has greatly increased the volume and peak rate of runoff to areas north of Maiden Lane. The increased flow rates have caused major erosion of the fine grained soils along the channels downstream as well as undesirable inundations of residential areas.

2. Evaluation of Alternatives

This project was identified in the Round Pond Creek Drainage Study prepared by Erdman, Anthony in 1976. No reasonable alternatives to the proposed action were determined at that time.

3. Lands for Project.

The project lies almost entirely within lands owned by the Town of Greece. Minor grading will extend into lands owned by the NYSDOT for future Rte 47. The Regional office of NYSDOT has reviewed the project and agreed in concept (see letter Dated May 5, 1977, sheet E-2)

BY RCA DATE 6/29/77 ERDMAN, ANTHONY, ASSOCIATES SHEET OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME

2. OVERALL TOWN PROGRAM OF FLOOD CONTROL

This project represents one part of a comprehensive program of flood control which has been undertaken by the Town of Greece. The thrust of this program will be towards constructing a minimal number of large detention facilities and avoiding the problems associated with each developer providing a small detention pond. As part of this program, major facilities have already been constructed at Deschel Drive and St. Andrews Drive.

BY MA DATE ERDMAN, ANTHONY, ASSOCIATES SHEET 41 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road Park

DRAINAGE AREA.

From Paddy Hill Creek,	2895	acres
Effective acreage from Kirk Creek diversion	338	acres
Total area (effective) =	3233	acres

Areas are outlined on Plate I. Paddy Hill Creek in red. Kirk Creek in yellow.

HAZARD CLASS

Areas downstream of the proposed impoundment are primarily existing or planned single family developments with the exception of the wetland areas located north of the old Penn-Central Railroad. In this case, NYSDEC Hazard Class "C" would be appropriate

HYDROLOGIC DESIGN CRITERIA.

Refer to "NYSDEC "Guidelines For Design of Small Dams".

Service spillway Design Flood	50 year
Spillway Design Flood	60% of MPF
Minimum Freeboard	2 ft.

BY WDD DATE 5/3/77 ERDMAN, ANTHONY, ASSOCIATES SHEET 2 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road

HYDROLOGIC COMPUTATION METHODS.

Hydrologic computations for this project were made using the U.S. Soil Conservation Service computer program TR-20 on an IBM 1130 computer. This program combines and routes hydrographs from each subarea of the drainage basin.

The computations assume full development of the upstream drainage area in accordance with the Town of Greece Master Plan.

upstream detention is assumed along tributary (O-121-1'-2) as follows:

Existing Park Ridge Hospital Detention Pond	19.9 acre-ft.
Future Sannita Drive Detention Project.	18 acre-ft.

The ultimate land use of the upstream watershed is primarily single family residential development, with the exception of the industrial area located south of Ridge Road and east of Route 47. The overall CN factor for the upstream watershed is 79.5.

In addition, detention of 8 acre-ft is assumed south-east of the Ridgeway Ave-Lee Rd intersection. This project is in final design phase as part of Monroe County Highway Improvement Project.

The Q50 flood routing is shown on Sheet A3
The QMPF routing is shown on Sheet A4

ENGLISH ROAD PARK
DETENTION FACILITY
Q_{50} FLOOD ROUTING
6/22/77

SUBROUTINE ADDHYD CROSS SECTION 44
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES (CFS)	PEAK ELEVATIONS
16.29	1357.139	(NULL)
15.46	385.583	(NULL)
17.77	348.110	(NULL)
23.92	253.487	(NULL)

HYDROGRAPH, TZERO= 4.00 DELTA T= 0.40 DRAINAGE AREA= 5.06

TIME											
4.00	DISCHG	0.00	0.37	2.40	5.97	10.13	16.40	25.64	47.95	81.37	122.91
8.00	DISCHG	193.52	327.82	554.25	847.72	1112.52	1307.72	1350.19	1205.71	1003.29	810.40
12.00	DISCHG	670.18	576.73	519.55	491.44	474.77	434.73	412.09	391.06	381.54	384.56
16.00	DISCHG	368.89	339.12	311.09	322.73	345.75	344.03	323.50	299.35	284.12	277.30
20.00	DISCHG	274.88	274.28	273.51	271.38	258.64	237.86	219.93	211.92	222.44	240.85
24.00	DISCHG	252.82	227.76	175.24	117.29	74.23	52.32	42.19	37.26	34.57	32.73
28.00	DISCHG	31.32	29.85	26.24	26.42	24.63	22.88	21.27	19.72	18.32	16.96
32.00	DISCHG	15.74	14.57	13.51	12.49	11.57	10.69	9.90	9.13	8.46	7.80
36.00	DISCHG	7.22	6.65	6.17	5.69	5.29	4.89	4.56	4.22	3.95	3.67
40.00	DISCHG	3.43	3.20	3.00	2.80	2.64	2.47	2.33	2.18	2.07	2.07

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.5616 CFS-HRS= 8375.05 ACRE-FT= 692.11

INFLOW HYDROGRAPH

SUBROUTINE RESVOR STRUCTURE 4
SURFACE ELEVATION= 336.50

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
11.59	890.068	351.71
24.22	239.979	342.42
26.78	47.340	339.09
27.59	38.984	338.75
28.38	33.696	338.54
29.14	28.933	338.35
29.90	24.571	338.18
30.65	20.897	338.03

OUTFLOW HYDROGRAPH

HYDROGRAPH, TZERO= 4.00 DELTA T= 0.40 DRAINAGE AREA= 5.06

TIME											
4.00	DISCHG	0.00	0.29	1.98	5.37	9.49	15.29	24.75	46.24	74.20	97.23
4.00	ELEV	336.50	336.52	336.64	336.90	337.21	337.64	338.19	339.04	340.06	340.56
8.00	DISCHG	147.51	223.49	302.06	396.49	482.20	554.31	614.00	658.11	760.73	890.01
8.00	ELEV	341.10	342.19	343.31	344.84	346.49	348.10	349.60	350.84	351.58	351.71
12.00	DISCHG	757.54	677.13	669.19	659.10	648.26	636.33	621.52	604.57	587.75	571.95
12.00	ELEV	351.58	351.41	351.17	350.97	350.54	350.19	349.78	349.36	348.94	348.54
16.00	DISCHG	556.93	538.61	517.06	496.87	480.46	466.78	448.51	424.56	401.36	380.29
16.00	ELEV	348.17	347.74	347.26	346.81	346.45	346.15	345.79	345.35	344.93	344.55
20.00	DISCHG	362.09	343.39	318.29	301.73	288.47	273.94	257.49	242.30	233.25	232.65
20.00	ELEV	344.21	343.96	343.54	343.31	343.12	342.91	342.67	342.46	342.33	342.32
24.00	DISCHG	237.78	238.68	225.25	179.70	110.50	71.57	30.03	47.33	26.57	38.89
24.00	ELEV	342.39	342.40	342.21	341.56	340.57	340.02	339.40	339.09	338.27	338.75
28.00	DISCHG	26.64	33.68	25.42	28.83	22.93	24.40	20.25	20.69	18.03	17.43
28.00	ELEV	338.26	338.54	338.21	338.35	338.11	338.17	338.01	338.02	337.85	337.80
32.00	DISCHG	15.78	14.82	13.62	12.67	11.69	10.87	10.01	9.25	8.55	7.90

A3

EXE. .IVF CONTROL CARD OPERATION INCREM. ...N TIME INCREMENT= 0.40
EXECUTIVE CONTROL CARD OPERATION COMPUT. FROM XSECTN/STRUCT 0/ 1 TO XSECTN/STRUCT 0/ 4
STARTING TIME= 0.00 RAIN DEPTH= 19.60 RAIN DURATION= 6.00 RAIN TABLE NO.= 2 SOIL CONDITION= 2
ALTERNATE NO.= 1 STORM NO.= 6

ENGLISH ROAD PARK
DETENTION FACILITY
MAX. PROBABLE FLOOD RUN
4/12/77

SUBROUTINE RUNOFF STRUCTURE 1
AREA= 4.53 INPUT RUNOFF CURVE= 79.5 TIME OF CONCENTRATION= 2.07
COMPUTED CURVE NO. = 79.5

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS (RUNOFF)
3.69	15054.421	

TIME		HYDROGRAPH, TZERO= 0.00				DELTA T= 0.40			DRAINAGE AREA= 4.53		
0.00	DISCHG	0.00	1.52	30.59	180.95	632.84	1713.32	4162.86	8395.28	12985.49	14975.08
4.00	DISCHG	14288.41	12452.29	10570.97	8999.52	7699.62	6630.87	5702.36	4703.55	3576.73	2512.47
8.00	DISCHG	1682.89	1098.38	698.62	433.81	272.67	173.64	107.63	65.01	37.69	20.13
12.00	DISCHG	8.79	2.29	0.00							

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 17.0729 CFS-HRS= 49913.19 ACRE-FT= 4124.82

INFLOW HYDROGRAPH

SUBROUTINE RESVOR STRUCTURE 4
SURFACE ELEVATION= 334.00

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
3.73	15205.085	356.75
12.82	72.140	336.40
13.62	45.454	335.81
14.42	27.921	335.11
15.22	17.169	334.68
16.02	10.564	334.42
16.82	6.497	334.25
17.62	3.992	334.15
18.42	2.455	334.09
19.22	1.509	334.06

OUTFLOW HYDROGRAPH

TIME		HYDROGRAPH, TZERO= 0.00				DELTA T= 0.40			DRAINAGE AREA= 4.53		
0.00	DISCHG	0.00	1.36	27.58	174.56	399.19	504.28	665.32	7527.24	12005.68	14996.34
0.00	ELEV	334.00	334.05	335.10	338.20	342.12	345.47	350.81	354.47	355.88	356.70
4.00	DISCHG	14439.28	12806.09	10930.10	9295.64	7971.55	6847.86	5899.14	4931.62	3831.66	2861.38
4.00	ELEV	356.55	356.11	355.56	355.07	354.62	354.24	353.90	353.51	353.06	352.58
8.00	DISCHG	1942.21	1379.99	928.07	665.87	651.03	625.46	593.96	559.26	523.27	475.53
8.00	ELEV	352.10	351.66	351.24	350.83	350.24	349.39	348.42	347.30	346.10	344.51
12.00	DISCHG	403.47	-87.23	71.72	-57.52	45.10	-35.36	27.73	-21.74	17.05	-13.37
12.00	ELEV	342.26	330.51	336.39	331.69	335.80	332.58	335.10	333.13	334.68	333.46
16.00	DISCHG	10.48	-8.22	6.44	-5.05	3.96	-3.10	2.43	-1.91	1.49	-1.17
16.00	ELEV	334.41	333.67	334.25	333.79	334.15	333.87	334.09	333.92	334.05	333.95
20.00	DISCHG	0.92	-0.72	0.56	-0.44	0.34	-0.27	0.21	-0.16	0.13	-0.10
20.00	ELEV	334.03	333.97	334.02	333.98	334.01	333.98	334.00	333.99	334.00	333.99
24.00	DISCHG	0.08	-0.06	0.04	-0.03	0.03	-0.02	0.01	-0.01	0.01	-0.00
24.00	ELEV	334.00	333.99	334.00	333.99	334.00	333.99	334.00	333.99	334.00	333.99
28.00	DISCHG	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00
28.00	ELEV	334.00	333.99	334.00	333.99	334.00	333.99	334.00	334.00	334.00	334.00

A4

BY KAA DATE 4/25/77 ERDMAN, ANTHONY, ASSOCIATES SHEET A5 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME

Aux. SPILLWAY DESIGN Flows

Max. Prob. Flood for Paddy Hill Creek = 15054 cfs
from 4/12/77 computer run.

Allowance for Kirk Creek diversion, controlled by pipe capacity, extreme flows will not be able to cross from Kirk to Paddy Hill, prelim size of diversion = 72" ϕ
Say 246 CFS

MPF = 15,300 CFS

60% MPF = 9180 CFS, Say 9200 CFS

Allowance for Service spillway, do not claim entire 860 ± CFS capacity. Allow some loss due to debris. See pg B6-B7 Say −700 CFS

Net req'd capacity of Aux. spillway = 8500 CFS.

BY JPA DATE 4/25/97 ERDMAN, ANTHONY, ASSOCIATES SHEET A6 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road

Manual Computation - Maximum Probable Flood

Refer to USDA - SCS National Engineering Handbook, Section 4, Chapter 21.

1. Rainfall Amount: as with computer program, use 19.6" of rainfall

3. Duration Adjustment: not req'd

2. Areal Adjustment: adjustment made using Corps Criteria for 20% reduction in total rainfall

4. Runoff Curve No: CN = 79.5

4. Determine Runoff Amount

CN = 79.5, P = 19.6

from Figure 10.1, Q = 16.8

5. Determine the Hydrograph Family

from Figure 21.3 (ES 1011) with CN = 79.5, P = 19.6, Hydrograph Family N° 1.

6. Determine Duration of Excess Rainfall, To

Figure 21.4 (ES 1012) with P = 19.6, CN = 79.5,

T_o = 5.6 hours.

7. Compute Initial value of Tp.

By Equation 21.4, pg 21.52

$T_P = 0.7\ T_c$, T_c = 2.07 hours from routing computations

$T_P = 0.7 \times 2.07 = 1.45$ hours

8. Compute T_o/T_P.

T_o = duration of excess rainfall = 5.6 hrs

$T_o/T_P = 5.6 / 1.45 = 3.86$

9. Select Revised T_o/T_P from Table 21.16

Initial $T_o/T_P = 3.86$

T_o/T_P revised = 4.0

10. Compute Revised Tp.

$$\text{Revised } T_P = \frac{T_o}{(T_o/T_P)_{rev.}} = \frac{5.6}{4.0} = 1.40$$

11. Compute q_p

Eqn 21.6, $$q_p = \frac{484\ A}{\text{Rev. TP}}$$

A = 2895 acres plus Kiva Creek diversion

Compute MPF based on PK Creek only, then add in flow from Kiva Creek

A = 4.53 acres

$$qp = \frac{484 \times 4.53}{1.40} = 1570 \text{ CFS}$$

12. Compute Q_{qp}

$$Q_{(qp)} = 2 \times qp = 16.8 \times 1570 = 26{,}400 \text{ CFS}$$

13. Compute Times for Hydrograph rate determinations

$$t = (t/T_p)(\text{Revised } T_p.) \qquad \text{Eqn 21.7}$$

BY UPA DATE 9/25/77 **ERDMAN, ANTHONY, ASSOCIATES** SHEET A 9 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME

	t/T_p *	t (hours)	q_c/q_p	q cfs	
1	0	0	0	0	
2	0.35	0.49	0.003	79	
3	0.70	0.98	0.015	396	
4	1.05	1.47	0.049	1290	
5	1.40	1.96	0.122	3220	
6	1.75	2.45	0.298	7870	about same as computer program result
7	2.10	2.94	0.528	13900	
8	2.45	3.43	0.585	15,450	←
9	2.80	3.92	0.518	13,700	
10	3.15	4.41	0.413	10,900	
11	3.50	4.90	0.334	8820	
12	3.85	5.39	0.273		
13	4.20	5.88	0.231		
14	4.55	6.37	0.185		
15	4.90	6.86	0.128		
16	5.25	7.35	0.080		
17	5.60	7.84	0.047		
18	5.95	8.33	0.028		
19	6.30	8.82	0.017		
20	6.65	9.31	0.010		
21	7.00	9.80	0.006		
22	7.35	10.29	0.004		
23	7.70	10.78	0.003		
24	8.05	11.27	0.002		
25	8.40	11.76	0.001		
26	8.75	12.25	0		

$t = (t/T_p)(\text{Rev. } T_p) = 1.40\,(t/T_p)$

* from Table 21.17 for $T_o/T_p = 4$

$q = (q_c/q_p)(Q)(q_p)$, $q_p = 1570$, $Q = 16.8$

$q = (q_c/q_p)(26{,}400)$

Manual Comps. constitute a check of computer run.

BY MPA DATE June 7, 1977 ERDMAN, ANTHONY, ASSOCIATES SHEET #10 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road Park.

Low Flow Measurements - Paddy Hill Creek

Low flow measurements were made at the Latta Road box culvert. Part way through box, invert has a drop of 9" ± Flow is relatively uniform approaching drop. Depth of flow upstream of drop by 3' was 2" average. Approach velocity measured at 1 fps.
Width of weir = 5'-4"

$$Q = 3.0\ L\ H^{3/2}$$

$$H = 0.17 + \frac{V^2}{2g} = 0.17 + \frac{1.0}{64.4} = 0.19'$$

$$H^{3/2} = 0.083$$

$$Q = 3.0 \times 5.33 \times 0.083 = 1.3\ CFS$$

Area at Project site = 2895 ac.

Area at point of measurement = 3430 ac.

BY NPA DATE 5/5/97 ERDMAN, ANTHONY, ASSOCIATES SHEET B-1 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road

AUXILIARY SPILLWAY LENGTH

Aux. spillway flow = 8500 CFS

The spillway will function as a broad crested weir. Refer to Handbook of Hydraulics, King and Brater, pg 5-23.

$$Q = C L H^{3/2}$$

on page 5-24,

"If the upstream corner of a weir is so rounded as entirely to prevent contraction, and if the slope of the crest is as great as the loss of head due to friction, flow occurs at critical depth and discharge is given by the rational formula"

$$Q = 3.087 L H^{3/2}$$

Important considerations in the selection of our weir coefficient are:

1. We will have a long (30'±) gradual approach @ 1.5% ± to the weir sill. Upstream slope beyond the 1.5% will be 1 on 3, with rounding at the pvt.
2. A concrete sill will be provided to ensure uniform Q/B for the entire weir length.
3. The slope downstream of the weir sill will be 2% for 7', then 1 on 6.5

4. Head H for the spillway design flood will be 3.5'.

Based on the above, our spillway will be very close to ideal conditions for a broad crested weir.

Assume $C = 3.05$

Assume $H = 3.5$, $H^{3/2} = 6.548$

$Q/b = C H^{3/2} = 3.05 \times 6.548 = 19.97$ CFS/LF

Weir length $= \frac{Q}{Q/b} = \frac{8500 \text{ CFS}}{19.97} = 426'$

BY LRA. DATE Mar 17, 1977 ERDMAN, ANTHONY, ASSOCIATES SHEET B3 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road

TAILWATER CURVE.

Exist downstream culvert is 14×5 box at English Road. Conditions at this structure are:

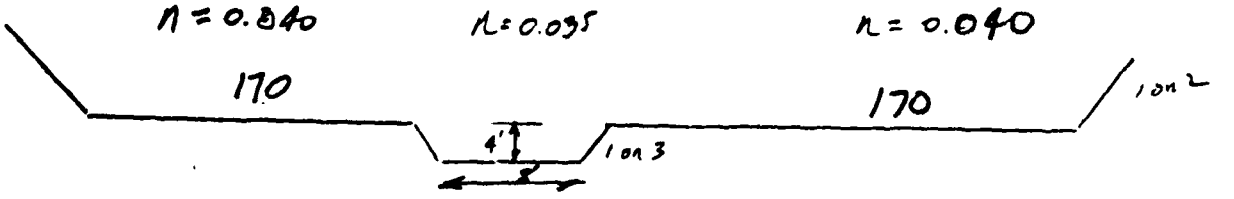
$Q_{10} = 520$, WS = 331.2
$Q_{50} = 700$, WS = 333.0
$Q_{100} = 925$, WS = 335.0 ± (overtop road)

The outlet of our dam will be ≈ 335.7

Slope of existing channel to English Road. $= \left(\frac{335.7 - 325.7}{1120}\right) = 0.0089$ ft/ft

Develop a rating curve for flow depth at outlet of dam, assuming no effect due to English Road. This is conservative assumption.

Assume a channel section as follows:



n factor selected to be conservative, actual n = 0.080 now, but trees could be removed at some time in future.

$S_o = 0.0089$ $S_o^{\frac{1}{2}} = 0.094$

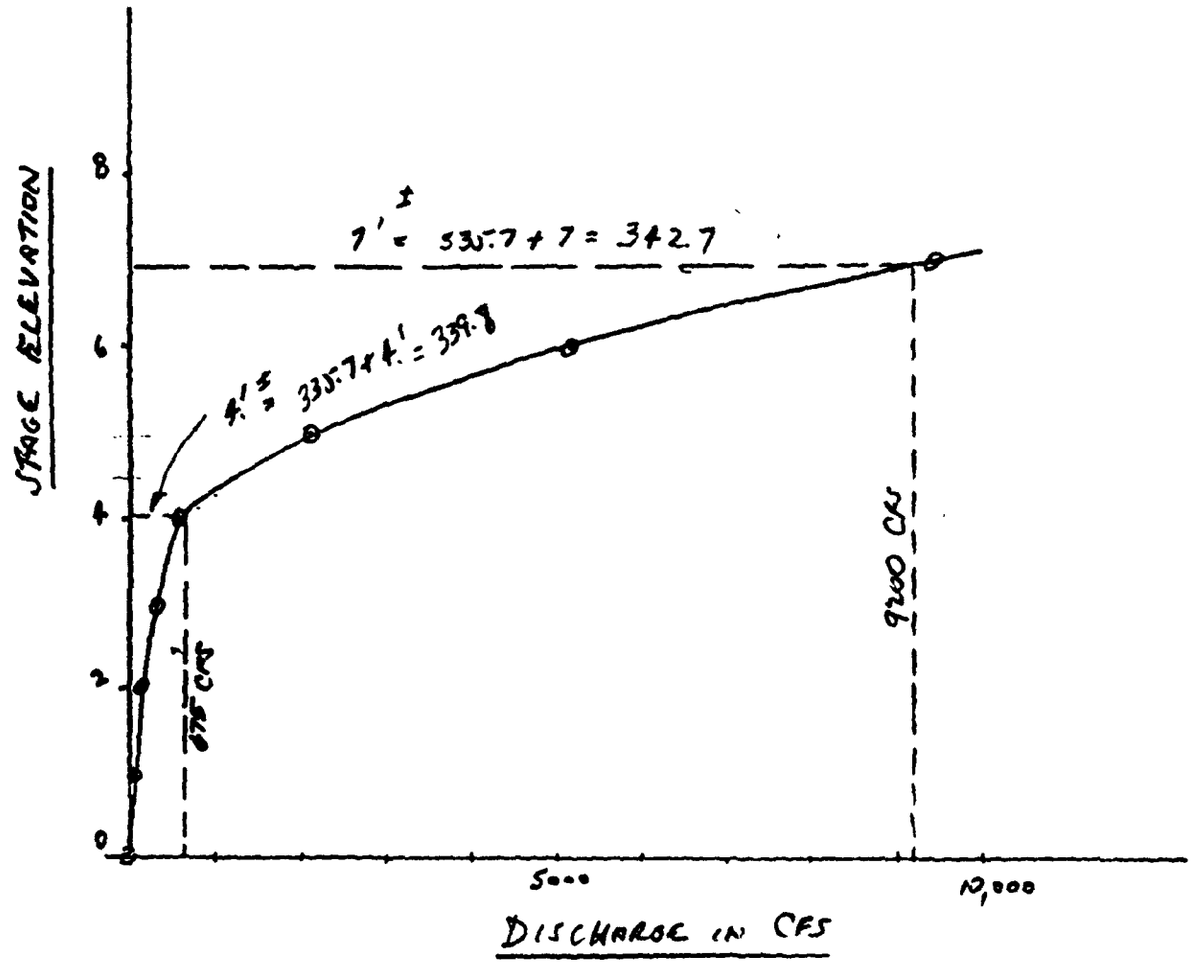
BY RIA DATE 5/3/77 **ERDMAN, ANTHONY, ASSOCIATES** SHEET B4 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME

C = Channel OB = overbank. Q = CFS
D = depth of flow K = Conveyance T = Total

D_c	K_c	Q_c	D_{OB}	K_{OB}	Q_{OB}	Q_T	V_c	V_{OB}
0	0	0	0	0	0	0		
1	392	37	0	0	0	37		
2	1456	137	0	0	0	137		
3	3311	311	0	0	0	311		
4	6093	573	0	0	0	573	7.2	
5	9935	934	1	12645	1189	2123		
6	14962	1406	2	40179	3778	5184		
7	21294	2002	3	79026	7434	9436		



AUXILIARY SPILLWAY RATING CURVE

∴ Auxiliary spillway ($C = 3.05$, $L = 426'$)

Elev	H	$H^{\frac{3}{2}}$	Q
351.5	0	0	0
352.0	0.5	0.35	460
353.0	1.5	1.84	2390
354.0	2.5	3.96	5140
355.0	3.5	6.58	8550
356.0	4.5	9.60	12470

PROJECT _____ By WA

DATE 6/21/77

AREA No: 1

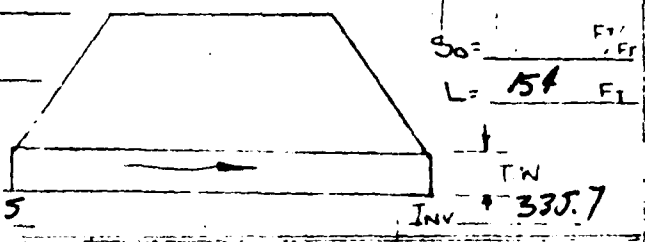
REMARKS: Service spillway

HYDROLOGIC & CHANNEL INFORMATION

DRAINAGE AREA _____ ACRES; _____ SQ.MI.

10 YR	25 YR	50 YR
Q_1=	Q_2=	Q_3=
Q_1=	Q_2=	Q_3=
Inlet	TW_2=	TW_3=

SKETCH



	Q	SIZE	HEAD WATER COMPUTATIONS: INLET CONT. HW/D	HW	OUTLET CONTROL Ke	dc	dc+D/2	h	H	Ln	HW	CONTROLS H	OUTLET VELOCITY	COMMENTS
n=0.013 RCP	100	84"	0.5	3.5	0.5	2.6	4.8	≤ 4.8	0.2	0.8	4.2	4.2		
"	200		0.75	5.3		3.7	5.4	≤	0.7		5.3	5.3		
"	300		0.97	6.8		4.6	5.8	≤	1.7		6.7	6.8		
"	400		1.20	8.4		5.3	6.1	≤	3.0		8.3	8.4		

ARY & RECOMMENDATIONS:

Downstream T.W. will not effect culvert outflow.

ERDMAN and ANTHONY

BY _____ DATE _____

CKD _____ DATE _____

OWNER _____

SUBJECT _____

PROJECT NAME _____

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PROJECT _____ BY KIA DATE 6/21/77

AREA NO: REMARKS: Service spillway

HYDROLOGIC & CHANNEL INFORMATION

DRAINAGE AREA _____ ACRES; _____ SQM.

SKETCH

STATION _____

ELEV. _____

ELEV. _____

AHW=

INV 336.1

S_o= _____ FT/FT

L= 154 FT

TW

INV 335.7

10 YR	25 YR	50 YR
Q_1=	Q_2=	Q_3=
Q_1=	Q_2=	Q_3=
TW_1=	TW_2=	TW_3=

CULVERT TYPE	Q	SIZE	HEAD WATER COMPUTATIONS: INLET CONT HW/D	INLET CONT HW	OUTLET CONTROL Ke	OUTLET CONTROL dc	OUTLET CONTROL $\frac{dc+D}{2}$	OUTLET CONTROL h_o	OUTLET CONTROL H	OUTLET CONTROL $L S_o$	OUTLET CONTROL HW	CONTROLLING H	OUTLET VELOCITY	COMMENTS
n= 0.013	500	84"	1.45	10.1	0.5	5.8	6.4	≤	4.7	0.8	10.3	10.3		
n=	600		1.70	11.9		6.3	6.6	≤	6.8		12.6	12.6		
n=	700		2.06	14.4		6.7	6.8	≤	9.5		15.5	15.5		
n=	800		2.23	15.6		7.0	7.0	≤	12.0		18.2	18.2		

SUMMARY & RECOMMENDATIONS:

BY _____ DATE _____

CKD _____ DATE _____

OWNER _____

SUBJECT _____

PROJECT NAME _____

ERDMAN and ANTHONY

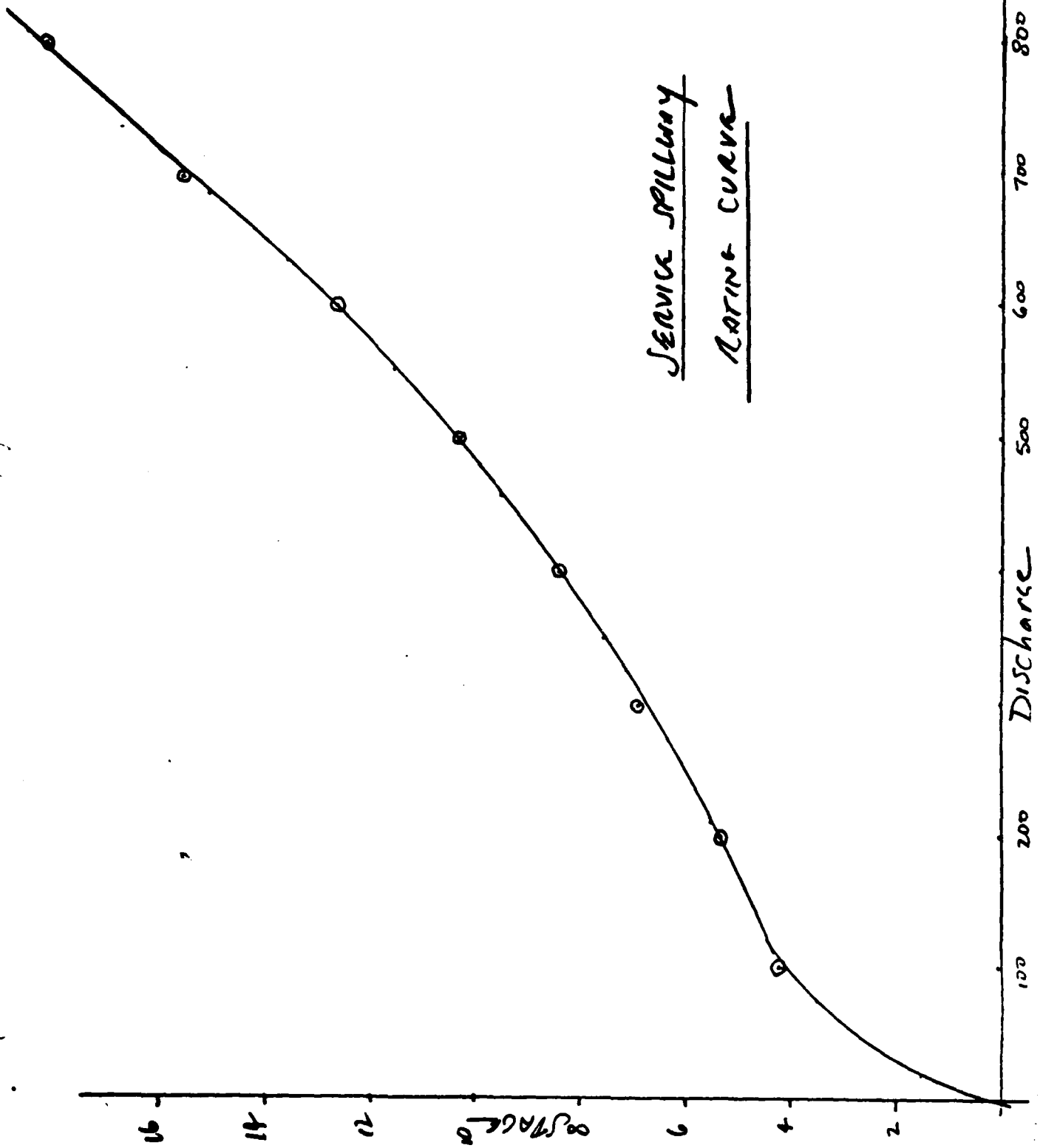
SHEET NO B7 OF

LOCATION _____

BY VMA DATE 6/21/17 ERDMAN, ANTHONY, ASSOCIATES SHEET B8 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME



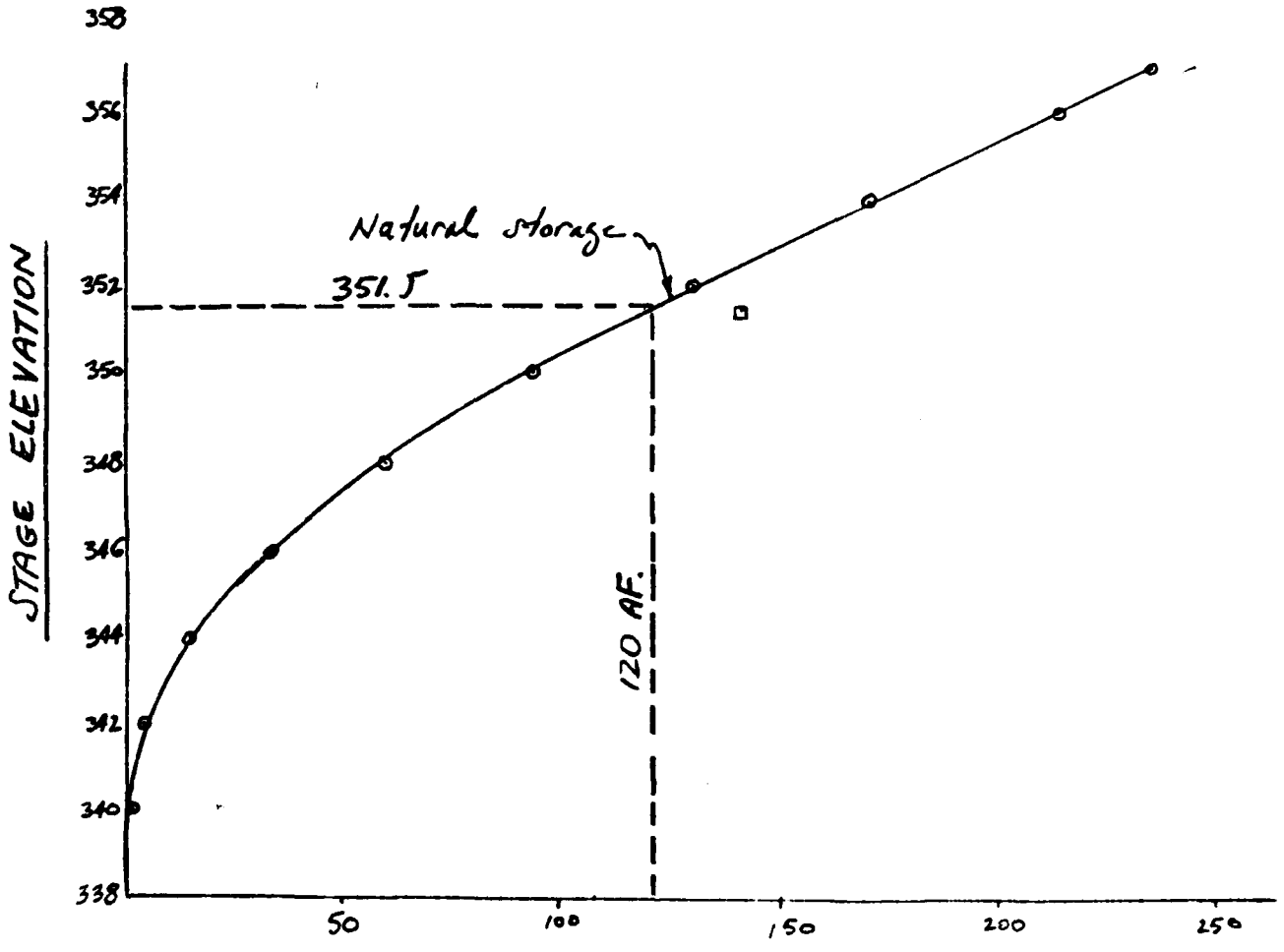
BY XPA DATE 5/3/17 ERDMAN, ANTHONY, ASSOCIATES SHEET B9 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road

ENGLISH ROAD PARK DETENTION

STAGE - STORAGE CURVE



BY MES DATE 6/21/77 ERDMAN, ANTHONY, ASSOCIATES SHEET B10 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road

SUMMARY - STAGE - STORAGE - OUTFLOW DATA.

Stage.	Storage	Serv. spill	Aux. spill	Total Q.
336.5	0	0	0	0
338.0	0.1	20	0	20
340.0	0.2	70	0	70
342.0	3.5	210	0	210
344.0	14	350	0	350
346.0	33	460	0	460
348.0	61	550	0	550
350.0	94	630	0	630
351.5	120	680	0	680
352.0	130	700	460	1160
353.0	150	740	2390	3130
354.0	170	770	5140	5910
355.0	190	810	8550	9360
356.0	212	850	12470	13320

BY WRP DATE 5/17/77 ERDMAN, ANTHONY, ASSOCIATES SHEET D1 OF

CKD DATE SUBJECT SUB-SHEET NO.

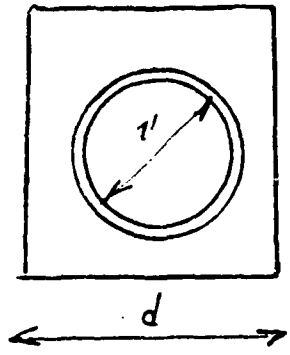
OWNER PROJECT NAME English Road

Service Spillway Seepage Collars

$L = 151'$

NRCS requires 15% of 151' = 22.65'

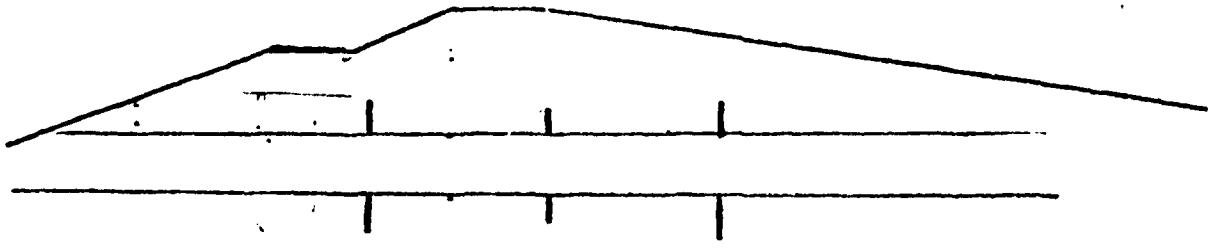
use 3 separate collars, $\frac{22.65'}{3} = 7.6'$ per collar



$d = 7'-0" + (2 \times 8") + 2 \times \left(\frac{7.6}{2}\right) =$

$= 7'-0" + 1'-4" + 7'-7"$

$= 15'-11"$ say $16'$



BY KA DATE 5/9/97 ERDMAN, ANTHONY, ASSOCIATES SHEET D2 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road Park

AUXILIARY SPILLWAY DESIGN - STONE PROTECTION

$Q/3 = 19.97$ CFS/LF

assume $n = 0.050$

Slope $S_o = 1$ on $6.5 = 0.154$

$S_o^{1/2} = 0.39$

$$K = \frac{Q}{S_o^{1/2}} = \frac{19.97}{0.39} = 51.2$$

$$y = \left(\frac{K}{1.486/n}\right)^{0.6} = \left(\frac{51.2}{29.7}\right)^{0.6} = (1.72)^{0.6} = 1.38'$$

$$V = \frac{19.97 \text{ CFS/LF}}{1.38 \text{ ft}} = 14.5 \text{ fps.}$$

Refer to HEC N° 11, "Use of Riprap for Bank Protection"

Assume WYDOT Medium Dumped Stone)

$K = 50\%$ Stone size = 1.1' ϕ = 100 #

$$\frac{K}{d} = \frac{1.1}{1.38} = 0.80$$

Refer to Figure N° 1, Pg 11-5

$$\frac{V_s}{V_o} = 0.92$$

$V_s = 0.92\ V = 0.92 \times 14.5 = 13.3$ fps.

$V_{allowable}$ from Figure 2, Pg 11-6 - 13.2 FPS, OK.

BY KAA DATE 6/3/97 ERDMAN, ANTHONY, ASSOCIATES SHEET D3 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME Englich Road Park

In order to be conservative, specify NYSDOT heavy stone filling,

$$d_{50} = 600\# = 1.9'\phi$$

$$H/d = \frac{1.9}{1.38} = 1.38$$

. Refer to Figure No 1, pg 11-5

$$\frac{V_s}{V_0} = 1.0 \quad , V_s = 14.5$$

Allowable velocity from Figure 2, pg 11-6 = 17+

BY RPA. DATE 5/2/77 ERDMAN, ANTHONY, ASSOCIATES SHEET D4 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME Eng. Rock.

AUXILIARY SPILLWAY - FREEBOARD.

Refer to Design of Small Dams, pg 393

$$\text{Freeboard} = 2.0 + 0.025 \sqrt[3]{d}$$

$V = 14.5$

$d = 1.38 \qquad d^{.333} = 1.11$

$$\text{Freeboard} = 2.0 + 0.025 \times 14.5 \times 1.11 = 2.4'$$

In this case, make freeboard for levee and channel the same, 2', as that we are designing for std' project Fb.d.

BY LLA DATE 5/4/77 ERDMAN, ANTHONY, ASSOCIATES SHEET D5 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road

HYDRAULIC JUMP CONDITIONS @ END OF AUX. SPILLWAY.

For spillway design flood,

$Q/3 = 19.97$

depth of flow = 1.38'

velocity = 14.5 fps.

$$F = \frac{V}{\sqrt{gd}} = \frac{14.5}{\sqrt{32.2 \times 1.38}} = \frac{14.5}{6.66} = 2.2$$

Form "A" jump, Bur Rec, Design of Small Dams, pg 394.

$$\frac{d_2}{d_1} = \frac{1}{2}\left(\sqrt{8F_1^2 + 1} - 1\right)$$

$d_1 = 1.38$, $F_1 = 2.2$

$$\frac{d_2}{d_1} = \frac{1}{2}\left(\sqrt{(8 \times 4.84) + 1} - 1\right)$$

$$= \frac{1}{2}(6.3 - 1) = \frac{1}{2}(5.3) = 2.65$$

$\therefore$ $d_2 = 2.65\, d_1 = 2.65 \times 1.38 = 3.66$ ft.

$\frac{L}{d_2}$ from Figure B-15, pg 5-71 = 4.3

$\therefore$ $L = 4.3\, d_2 = 4.3 \times 3.66 = 15.7$ ft.

$\therefore$ carry stone 16' beyond toe of the 1 on 6.5 slope spillway. This is conservative in that Bur Rec tables are for concrete aprons. With dumped stone and greater roughness, jump length would be less.

BY HPA DATE 5/6/77 ERDMAN, ANTHONY, ASSOCIATES SHEET D6 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road

Elevation of downstream walls must be

$(339.4 + d_2 + \text{freeboard})$ as a minimum

$\text{freeboard} = 0.1\,(V_1 + d_2) = .1\,(12.5 + 3.6) = 1.8'$

$339.4 + 3.7 + 1.8 = 344.9$ say 345.0

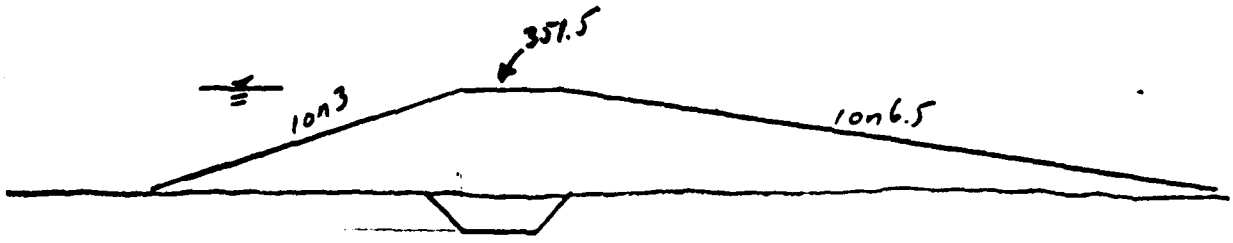
The 3.7' value of d_2 would represent desirable tailwater depth for the std. project flood flow. The tailwater curve in section "B" is very conservative in the assumption of "n" factors.

BY NHA DATE 5/3/77 ERDMAN, ANTHONY, ASSOCIATES SHEET D7 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road

DESIGN OF AUXILIARY SPILLWAY EMBANKMENT



Assume max. head will occur for 100 water surface = 351.5

Assume tailwater = 340.0

$h = 351.5 - 340.0 = 11.5'$

Soils consist of fine sands or fine sands overlying glacial till, which in turn overlay the layered shales and siltstones, depth to rock will be in the 3-5' range.

Refer to Bureau of Rec., Design of Small Dams, pg 224.

"Whenever economically possible, seepage through a pervious foundation should be cut off by a trench extending to bedrock or other impervious stratum."

In this project, rock is at shallow depths in flood plain. Use cutoff trench excavated to rock and remove any loose shales at surface of rock as means of controlling seepage.

BY 10A DATE ERDMAN, ANTHONY, ASSOCIATES SHEET D8 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME

The width of the cutoff trench should be at least:

$W = h - d$ where $h = 11.5$

$d = 4' \pm$ to bottom of loose shales

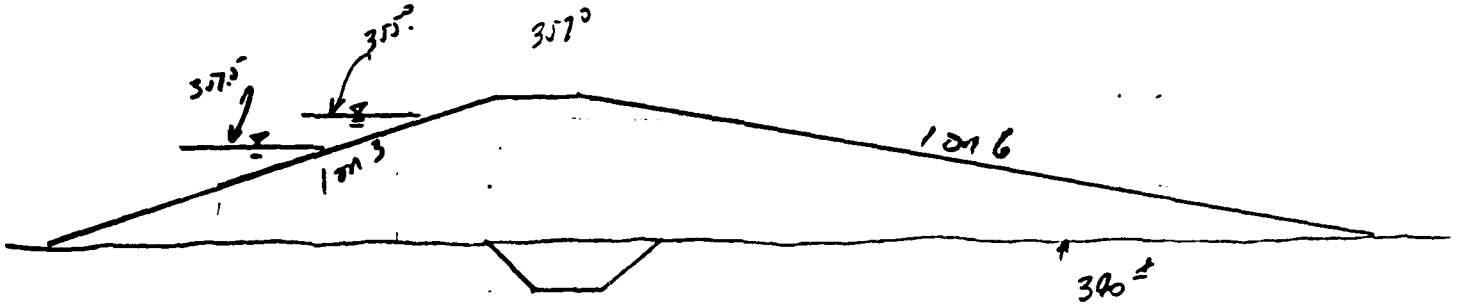
$W = 11.5 - 4 = 7.5$

Say $W = 8'$, 1on1 sideslopes

Due to flat slopes utilized, no further analysis of embankment req'd.

Embankment to be homogeneous rolled fill from borrow.

DESIGN OF LEVEE EMBANKMENT.



Assume max. head = 357.5 - 340.0 = 11.5'
SOF flow will make tailwater go to 343.±

Design for seepage to be same as that for adj. spillway section

W = 11.5 - 4 = 7.5' say 8', 1on1 sideslopes

Due to flat slopes utilized, no further analysis of embankment reqd.

BY MCA DATE 6/29/77 ERDMAN, ANTHONY, ASSOCIATES SHEET D10 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road

SELECTION OF STILLING BASIN FOR JERVICK SPILLWAY

In that the Froude N° of discharge is close to 1.0 any forms of hydraulic jump basin would be ineffective for velocity reduction.

Impact basins, such as Bur. Rec utilizes would be extremely large and costly.

Most reasonable design in this case would be Colorado State University Non-scouring Riprapped Basin. The recommended length of protection was determined by manual computation and computer run.

$L_{manual} = 67.5'$

$L_{computer\ run} = 80'$

To be conservative, use 80' of heavy stone filling.

BY [illegible] DATE 5/11/77 ERDMAN, ANTHONY, ASSOCIATES SHEET D11 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Rd.

Service Spillway Energy Dissipation Colorado U. Method

84" ϕ RCP, D = 7.0

Q = 675 CFS

Outlet velocity = 19.5 fps

tailwater = d_t = 4.0'

V_{ch} = allowable downstream velocity = 8 fps.

y_o = depth of flow at outfall section, assume $\frac{d_c + D}{2}$ = 5.8'

$$\frac{Q}{D^{2.5}} = \frac{675}{7^{2.5}} = \frac{675}{130} = 5.19 \text{ ft}^3/\text{sec}/\text{ft}^{5/2}$$

$$\frac{d_t}{D} = \frac{4.0}{7.0} = 0.57$$

$$\frac{d_t}{y_o} = \frac{4.0}{5.8} = 0.69$$

$$\frac{y_o}{D} = \frac{5.8}{7.0} = 0.83$$

from Table 9B, $\tan\theta = 0.1$ for $d_t/y_o = 0.69$

$$L = [1/2 \tan\theta)][(Q/d_t V_{ch}) - D]$$

$$L = \left[\frac{1}{0.2}\right]\left[\left(\frac{675}{4.0 \times 8}\right) - 7\right] = 5 \times (20.5 - 7)$$

$$L = 67.5'$$

Check θ by computation:

$$\tan\theta = 0.0495\left(d_t/y_o\right)^{-1.52} \quad \text{for } \frac{d_t}{y_o} \text{ from } 0.4 - 1.2$$

$$= 0.0495 \times 1.964 = 0.097 \simeq 0.1$$

Check size of stone required for service spillway

Assume depth of flow = 4'

stone ϕ = 1.9' = 1C

$$K/d = \frac{1.7}{4} = 0.48$$

from figure 1, HEC N° 11,

$$\frac{V_s}{V} = 0.76$$

$$V_s = 0.76 \times 19.5 = 14.8 \text{ FPS}$$

From Figure 2, HEC N° 11,

Allowable V_s = 17 FPS for 600 # stone.

C. 1 Colorado State University Non-Scouring Riprapped Basin

The basic function of this basin is to allow the high velocity jet at the culvert outlet to expand laterally until the flow velocity is reduced to a stable level in the natural channel. The expansion angle of the velocity jet is duplicated by the basin geometry to eliminate scour. No advantage is gained in protecting for velocities less than those that occur naturally.

Two design procedures are employed in the Non-Scouring Riprapped Basin. The first case is the low tailwater design where the tailwater is less than the culvert rise. The second case is the high tailwater design where the tailwater is equal to or greater than the culvert rise. The methods are identical excepting the basin length and flare angle calculations. In both cases, the scour hole depth, length, and width will be zero if a non-scouring rock size is used.

In the low tailwater case, the length of basin depends on the channel allowable average velocity. Figure (20) and Figure (21) for circular and rectangular shapes respectively, yield estimates of the required flare angle. The curves are entered with a tailwater depth/brink depth ratio to obtain the flare angle in terms of the tangent of the angle. The curves are based on outlet Froude numbers of 1.5 and 1.4. Compensation for larger or smaller Froude numbers is accomplished by multiplying the flare angle by 1.5/Froude number for circular culverts and 1.4/Froude number for rectangular culverts. Using the tangent of the angle, the discharge, the tailwater depth, the allowable average channel velocity, and the basin inlet width, the basin outlet width is then obtained by the continuity equation based on conservation of mass. The basin inlet width is combined with the basin outlet width and flare angle to compute the basin length.

The high tailwater case employs Figure (22) to compute the basin length by using the arithmetic mean of the velocities measured along a vertical centerline at the culvert outlet and the arithmetic mean of the velocities measured along a vertical centerline at X distance downstream. The former is computed by multiplying the culvert outlet average velocity by 1.10 (smooth pipe) or 1.15 (rough pipe). The latter is estimated by using the channel maximum velocity. The distance X or basin length is then obtained from the curve. The outlet width of the basin is found by using the continuity equation. The possible diversion of the jet from side to side depends on the ratio of basin outlet width to basin inlet width. If the basin outlet width is greater than four times the basin inlet width, the danger of jet attachment to a wall is minimum. The high tailwater problem can also be solved by riprapping the downstream channel banks.

Equations:

$C=(1./2.\ \tan\theta)((Q/((TW)(V_a)))-W_o)$	Non-Scouring Basin Length (ft) Figure (8)
$B=Q/((TW)(V_a))$	Non-Scouring Basin Outlet Width (ft) Figure (8)

An Estimate of the Angle of Lateral Expansion for Horizontal and Mild Sloping Circular Culverts - Figure (20)

These equations were derived from multiple regression analysis of Figure (20)

$\tan\theta = 1.8-5.5(d_t/Y_o)$ (d_t/Y_o range 0.0-0.23)

$\tan\theta = 0.0714(d_t/Y_o)^{-1.42}$ (d_t/Y_o range 0.23-0.40)

$\tan\theta = 0.0495(d_t/Y_o)^{-1.82}$ (d_t/Y_o range 0.40-1.20)

Minimum $\tan\theta = 0.05$

An Estimate of the Angle of Lateral Expansion for Horizontal and Mild Sloping Rectangular Culverts - Figure (21)

These equations were derived from multiple regression analysis of Figure (21)

$\tan\theta = 0.90 + 4.67(0.20-d_t/Y_o)$ (d_t/Y_o range 0.0-0.20)

$\tan\theta = 0.05 + 1.3158(1.-d_t/Y_o)^{1.91624}$ (d_t/Y_o range 0.20-1.20)

Minimum $\tan\theta = 0.05$

Distribution of Centerline Velocity for Flow from Submerged Outlets-Figure (22)

$X = 6.W_oV_{oave}/V_{xave}$ (V_{xave}/V_{oave} 0.1-0.6)

$X = W_o(22.62474+98.61093(V_{xave}/V_{oave})^3-33.01651(V_{xave}/V_{oave})^5-87.13084(V_{xave}/V_{oave})^2)$ (V_{xave}/V_{oave} 0.6-1.0)

CULVERT EROSION PROTECTION

D15

GREECE DRAINAGE STUDY

INPUT PARAMETERS

CULVERT	***OUTLET***	***CHANNEL***
TYPE = CIRCULAR	VELOCITY = 19.5 FPS	TAILWATER = 7.0 FT
SLOPE = 0.0090 FT/FT	DEPTH = 5.0 FT	MAXIMUM VELOCITY = 11.2 FPS
RISE = 7.0 FT	FROUDE NO. = 1.35	AVERAGE VELOCITY = 7.5 FPS
SPAN = 7.0 FT	DISCHARGE/BARREL = 700.0 CFS	
NO. OF BARRELS = 1.	PEAK DISCHARGE DURATION = 200. MIN	
BARREL SPACING = 0.0 FT		

RIPRAP

EFFECTIVE ROCK DIAMETER = 0.000 FT

RIPRAP ROCK SPECIFIC GRAVITY = 2.70

MAXIMUM ROCK DIAMETER = 0.000 FT

UNDER SLOPE = 0.00 FT/FT

EMBANKMENT SLOPE = 0.00 FT/FT

END SLOPE = 0.00 FT/FT

SIDE SLOPE = 0.00 FT/FT

CULVERT EROSION PROTECTION

D16

GREECE DRAINAGE STUDY

DESIGNED FOR SINGLE BARREL DISCHARGE

COLORADO STATE UNIVERSITY

ROCK RIPRAPPED BASINS

BASIN TYPE	EFFECTIVE ROCK DIAMETER	SCOUR DEPTH	SCOUR LENGTH	SCOUR WIDTH	BASIN INLET WIDTH -A-	BASIN OUTLET WIDTH -B-	BASIN LENGTH -C-	BASIN HEIGHT -D-	BASIN THICKNESS -E-	BASIN THICKNESS -F-	BASIN VOLUM
SCOURING	0.28 FT	9.4 FT	128.4 FT	34.1 FT	48.1 FT	48.1 FT	244.0 FT	10.5 FT	0.5 FT	10.0 FT	2603. CU
SCOURING	0.56 FT	5.6 FT	137.2 FT	28.3 FT	42.3 FT	42.3 FT	260.8 FT	10.5 FT	1.1 FT	6.0 FT	2078. CU
NON-SCOURING	0.98 FT	0.0 FT	0.0 FT	0.0 FT	7.0 FT	13.3 FT	80.0 FT	10.5 FT	1.9 FT	1.9 FT	274. CU
HYBRID	0.85 FT	1.7 FT	65.5 FT	15.4 FT	29.4 FT	29.4 FT	124.6 FT	10.5 FT	1.7 FT	3.4 FT	635. CU

SELECTION OF AUXILIARY SPILLWAY TYPE

Primary factors in selection of the recommended auxiliary spillway section were as follows:

1. Capacity Due to high runoff (CN = 79.5 and short time of concentration, the 60% MPF is quite high for a small watershed. The storage facility does not have sufficient capacity volumetrically to decrease the 60% MPF peak and $Q_{in} = Q_{out}$. In order to have as much storage as possible below aux. spillway, the height between aux. spillway crest and top of protective works must be minimized.

2. Tailwater The dissipation of energy resulting from auxiliary spillway flows must carefully consider what tailwater depths will be present. Due to the relatively steep (0.8% ±) valley slope and wide width of the floodplain, tailwater depths were found to be relatively low.

Types of spillways considered and comments on applicability are as follows:

1. Straight Drop. not recommended in park setting. Tailwater requirements would necessitate rock excavations for conc. stilling basin.

2. Gravity overflow Dam same tailwater problems as with straight drop. Costly and complex to construct and maintain at low level.

3. Ramp spillway with stone The most reasonable selection in this case, for the reasons noted below:

   a. Maximum length of seepage path for seepage consideration

   b. Relatively simple to construct and maintain.

   c. Limits velocities due to flow over heavy stone filling

   d. Can be made very conservative by using training walls, concrete weir wall, liner and bedding under heavy stone, etc.

BY WBA. DATE 6/27/77 ERDMAN, ANTHONY, ASSOCIATES SHEET D19 OF

CKD DATE SUBJECT SUB-SHEET NO.

OWNER PROJECT NAME English Road.

USE OF ON-SITE MATERIALS IN DAM EMBANKMENTS

Due to the poor gradation of the fine sands on site, their use in embankments should be limited to widening of the upstream face, in areas away from the spillway walls.

Transition Considerations: Refer to Design of Small Dams, Pg 265. "Transition zones are ordinarily not req'd between impervious and sand-gravel zones".

Rapid Drawdown. Considerations

Rapid drawdown is defined by Bureau as "6" or more per day following "prolonged storage at high reservoir levels." (Pg 264)

This facility will not be subjected to prolonged storage at high reservoir levels due to the relatively large size of service spillway

Reference to pg 262, Bureau Design of Small Dams:

"Flood damage due to failure of the upstream face is very unlikely. Failure can take place only during construction or following a rapid drawdown; in both cases the reservoir should be virtually empty."

RETAINING WALL/ABUTMENT DESIGN Panels A and B

ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15182.03 (HT=8.00)

CONTROL 3 -2, 1 4 1 0 0 0

CONCR FC	FSTEN	FSCOM	MAXT	MAXC	N	COVF	COVR	COVB	WT	WLC	UALL	VALL
1.200	20.000	20.000	1.5	0.5	10.0	2.00	2.00	3.00	0.150	1.00	0.240	0.052
EARTH WT	PHI	PALL	FRIC	FSS	FSO	RLOC	HO	SURC	SLOC	AXPLA	SHRA	PULA
0.120	36.75	5.000	0.45	1.50	2.00	0.33	0.0	0.00	0.0	0.000	0.000	0.000

STEM	HT	TOP	BATF	BATR	HTSS	DROP	DELT	SLPD
	8.00	1.50	0.00	0.00	0.00	-2.00	0.00	0.0

FOOTING	DPTH	TOE	HEEL	TMAX	HMAX	THMIN	EDT	EDH	PSPM
	1.75	1.50	7.50	2.00	10.00	1.50	0.00	0.00	2.50

LOADS	DLV	LLV	LLH	W/LL	W/SS	FR	HLOC	VLOC	EQAF	WTAB	CFH
	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	6.00	0.000

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE

HEIGHT	WIDTH	KIPSVERT	KIPSLAT	BM FTKIP	A TENSTL	P COMPSTL
8.00	0.00	0.000	0.060	0.040	-0.01	-0.17 0.02
6.00	1.50	0.449	0.241	0.321	0.01	0.06
4.00	1.50	0.899	0.662	1.165	0.02	0.18
2.00	1.50	1.349	1.443	3.211	0.09	0.40
0.00	1.50	1.799	2.585	7.180	0.24	0.73

FC MAX FOR STEM= 0.383 KSI BATR= 0.00

FOOTING DESIGN

WIDTH	DEPTH	FSO	FSS	RVERT	RECC	KSFMX	KSFMN	OM	RM
10.50	1.75	6.19	1.57	13.556	0.34	1.546	1.035	12.796	79.270

TOE RESULTS

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
1.50	1.385	1.807	0.00	0.01	0.03	0.05	0.44	19.977	0.128	0.00

HEEL RESULTS INCLUDE PRESSURE UNDER HEEL

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
7.50	10.174	2.468	0.03	0.10	0.22	0.37	0.62	19.962	0.373	0.00

D20

RETAINING WALL/ABUTMENT DESIGN Panels C-F

ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15182.03 (HT=6.00)

CONTROL 3 -2 1 4 1 0 0 0

CONCR FC	FSTEN	FSCOM	MAXT	MAXC	N	COVF	COVR	COVB	WT	WLC	UALL	VALL
1.200	20.000	20.000	1.5	0.5	10.0	2.00	2.00	3.00	0.150	1.00	0.240	0.052
EARTH WT	PHI	PALL	FRIC	FSS	FSO	RLOC	HO	SURC	SLOC	AXPLA	SHRA	PULA
0.120	36.75	5.000	0.45	1.50	2.00	0.33	0.0	0.00	0.0	0.000	0.000	0.000

STEM	HT	TOP	BATF	BATR	HTSS	DROP	DELT	SLPU
	6.00	1.50	0.00	0.00	0.00	-1.00	0.00	0.0

FOOTING	DPTH	TOE	HEEL	TMAX	HMAX	THMIN	EDT	EDH	PSPM
	1.50	1.50	4.50	2.00	10.00	1.50	0.00	0.00	2.50

LOADS	DLV	LLV	LLH	W/LL	W/SS	FR	HLOC	VLOC	EQAF	WTAB	CFH
	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	4.00	0.000

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE

HEIGHT	WIDTH	KIPSVERT	KIPSLAT	BM FTKIP	A TENSTL P	COMPSTL
6.00	0.00	0.000	0.015	0.005	-0.00	-0.02
4.00	1.50	0.449	0.135	0.135	0.00	0.03
2.00	1.50	0.899	0.496	0.708	0.02	0.13
0.00	1.50	1.349	1.217	2.362	0.05	0.33

FC MAX FOR STEM= 0.225 KSI BATR= 0.00

FOOTING DESIGN

WIDTH	DEPTH	FSO	FSS	RVERT	RECC	KSFMX	KSFMN	OM	RM
7.50	1.50	6.15	1.53	6.817	0.16	1.026	0.791	4.746	29.210

TOE RESULTS

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
1.50	0.848	1.094	0.00	0.01	0.02	0.04	0.32	19.978	0.118	0.00

HEEL RESULTS INCLUDE PRESSURE UNDER HEEL

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
4.50	2.941	1.345	0.01	0.03	0.07	0.13	0.40	19.968	0.228	0.00

D21

RETAINING WALL/ABUTMENT DESIGN Panel G

ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15182.03 (HT=6.00)

CONTROL 3 -2 1 4 1 0 0 0

CONCR FC	FSTEN	FSCOM	MAXT	MAXC	N	COVF	COVR	COVR	WT	WLC	UALL	VALL
1.200	20.000	20.000	1.5	0.5	10.0	2.00	2.00	3.00	0.150	1.00	0.240	0.052
EARTH WT	PHI	PALL	FRIC	FSS	FSO	RLOC	HO	SURC	SLOC	AXPLA	SHRA	PULA
0.120	36.75	5.000	0.60	1.50	2.00	0.33	0.0	0.00	0.0	0.000	0.000	0.000

STEM	HT	TOP	BATF	BATR	HTSS	DROP	DELT	SLPD
	6.00	1.50	0.00	0.00	0.00	-1.00	0.00	0.0

FOOTING	DPTH	TOE	HEEL	TMAX	HMAX	THMIN	EDT	EDH	PSPM
	3.00	1.50	3.75	1.50	10.00	1.50	0.00	0.00	2.50

LOADS	DLV	LLV	LLH	W/LL	W/SS	FR	HLOC	VLOC	EQAF	WTAB	CFH
	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	4.00	0.000

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE

HEIGHT	WIDTH	KIPSVERT	KIPSLAT	BM FTKIP	A TENSTL P	COMPSTL
6.00	0.00	0.000	0.015	0.005	-0.00	-0.02
4.00	1.50	0.449	0.135	0.135	0.00	0.03
2.00	1.50	0.899	0.496	0.708	0.02	0.13
0.00	1.50	1.349	1.217	2.362	0.05	0.33

FC MAX FOR STEM= 0.225 KSI BATR= 0.00

FOOTING DESIGN

WIDTH	DEPTH	FSO	FSS	RVERT	RECC	KSFMX	KSFMN	OM	RM
6.75	3.00	3.39	1.52	7.537	0.69	1.806	0.426	8.447	28.645

TOE RESULTS

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
1.50	1.400	1.782	0.00	0.01	0.02	0.03	0.23	19.985	0.070	0.00

HEEL RESULTS INCLUDE PRESSURE UNDER HEEL

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
3.75	4.416	1.914	0.01	0.02	0.05	0.08	0.25	19.978	0.128	0.00

D22

RETAINING WALL/ABUTMENT DESIGN Panels H, I & J - East Wall

ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15182.03 (HT=8.25)

CONTROL 3 -2 1 4 1 0 0 0

CONCR FC	FSTEN	FSCOM	MAXT	MAXC	N	COVF	COVR	COVB	WT	WLC	UALL	VALL
1.200	20.000	20.000	1.5	0.5	10.0	2.00	2.00	3.00	0.150	1.00	0.240	0.052

EARTH WT	PHI	PALL	FRIC	FSS	FSO	RLOC	HO	SURC	SLOC	AXPLA	SHRA	PULA
0.120	36.75	5.000	0.60	1.50	2.00	0.33	0.0	0.00	0.0	0.000	0.000	0.000

STEM	HT	TOP	BATF	BATR	HTSS	DROP	DELT	SLPD
	8.25	1.50	0.00	0.00	0.00	-1.00	0.00	0.0

FOOTING	DPTH	TOE	HEEL	TMAX	HMAX	THMIN	EDT	EDH	PSPM
	1.75	1.50	5.00	2.00	10.00	1.50	0.00	0.00	2.50

LOADS	DLV	LLV	LLH	W/LL	W/SS	FR	HLOC	VLOC	EQAF	WTAB	CFH
	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	6.25	0.000

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE

HEIGHT	WIDTH	KIPSVERT	KIPSLAT	BM FTKIP	A TENSTL	P COMPSTL
8.00	1.50	0.056	0.023	0.009	0.00	0.00
6.00	1.50	0.506	0.161	0.172	0.00	0.04
4.00	1.50	0.956	0.567	0.840	0.00	0.15
2.00	1.50	1.406	1.333	2.681	0.06	0.37
0.00	1.50	1.856	2.458	6.413	0.21	0.69

FC MAX FOR STEM= 0.363 KSI BATR= 0.00

FOOTING DESIGN

WIDTH	DEPTH	FSO	FSS	RVERT	RECC	KSFMX	KSFMN	OM	RM
8.00	1.75	3.65	1.52	9.506	0.70	1.818	0.558	11.796	43.101

TOE RESULTS

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
1.50	1.646	2.126	0.00	0.02	0.03	0.06	0.52	19.976	0.140	0.00

HEEL RESULTS INCLUDE PRESSURE UNDER HEEL

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
5.00	7.228	2.301	0.02	0.08	0.16	0.26	0.57	19.964	0.308	0.00

RETAINING WALL/ABUTMENT DESIGN Panel H - West Wall

ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15182.03 (HT=8.25)

CONTROL 3 -2 1 4 1 0 0 0

CONCR FC	FSTEN	FSCOM	MAXT	MAXC	N	COVF	COVR	COVB	WT	WLC	UALL	VALL
1.200	20.000	20.000	1.5	0.5	10.0	2.00	2.00	3.00	0.150	1.00	0.240	0.052
EARTH WT	PHI	PALL	FRIC	FSS	FSO	RLOC	HO	SURC	SLOC	AXPLA	SHRA	PULA
0.120	36.75	5.000	0.45	1.50	2.00	0.33	0.0	0.00	0.0	0.000	0.000	0.000
STEM	HT	TOP	BATF	BATR	HTSS	DROP	DELT	SLPD				
	8.25	1.50	0.00	0.00	0.00	-1.00	0.00	0.0				
FOOTING	DPTH	TOE	HEEL	TMAX	HMAX	THMIN	EDT	EDH	PSPM			
	1.75	1.50	7.50	2.00	10.00	1.50	0.00	0.00	2.50			
LOADS	DLV	LLV	LLH	W/LL	W/SS	FR	HLOC	VLOC	EQAF	WTAB	CFH	
	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	6.25	0.000	

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE

HEIGHT	WIDTH	KIPSVERT	KIPSLAT	BM FTKIP	A TENSTL P	COMPSTL
8.00	1.50	0.056	0.023	0.009	0.00	0.00
6.00	1.50	0.506	0.161	0.172	0.00	0.04
4.00	1.50	0.956	0.567	0.840	0.00	0.15
2.00	1.50	1.406	1.333	2.681	0.06	0.37
0.00	1.50	1.856	2.458	6.413	0.21	0.69

FC MAX FOR STEM= 0.363 KSI BATR= 0.00

FOOTING DESIGN

WIDTH	DEPTH	FSO	FSS	RVERT	RECC	KSFMX	KSFMN	OM	RM
10.50	1.75	6.34	1.55	12.937	0.37	1.497	0.966	11.796	74.840

TOE RESULTS

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
1.50	1.331	1.737	0.00	0.01	0.03	0.05	0.42	19.978	0.125	0.00

HEEL RESULTS INCLUDE PRESSURE UNDER HEEL

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
7.50	9.317	2.205	0.02	0.09	0.20	0.34	0.55	19.963	0.355	0.00

D24

RETAINING WALL/ABUTMENT DESIGN Panels 1 and K - West Wall

ENGLISH ROAD DETENTION POND - TOWN OF GREECE, N.Y. - PROJECT 15182.03 (HT=13.0)

CONTROL 3 -2 1 4 1 0 0 0

CONCR FC	FSTEN	FSCOM	MAXT	MAXC	N	COVF	COVR	COVB	WT	WLC	UALL	VALL
1.200	20.000	20.000	1.5	0.5	10.0	2.00	2.00	3.00	0.150	1.00	0.240	0.052
EARTH WT	PHI	PALL	FRIC	FSS	FSO	RLOC	HO	SURC	SLOC	AXPLA	SHRA	PULA
0.120	36.75	5.000	0.60	1.50	2.00	0.50	0.0	0.00	0.0	0.000	0.000	0.000

STEM	HT	TOP	BATF	RATR	HTSS	DROP	DELT	SLPD
	13.00	1.50	0.00	0.00	0.00	-1.00	0.00	0.0
FOOTING	DPTH	TOE	HEEL	TMAX	HMAX	THMIN	EDT	EDH	PSPM
	2.00	1.50	9.50	2.50	20.00	1.50	0.00	0.00	2.50
LOADS	DLV	LLV	LLH	W/LL	W/SS	FR	HLOC	VLOC	EQAF	WTAB	CFH
	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	11.00	0.000

STEM DESIGN ** HEIGHT MEASURED ABOVE TOP OF TOE

HEIGHT	WIDTH	KIPSVERT	KIPSLAT	BM FTKIP	A TENSTL	P COMPSTL
12.00	1.50	0.224	0.060	0.040	0.00	0.01
10.00	1.50	0.674	0.271	0.331	0.01	0.07
8.00	1.50	1.124	0.812	1.354	0.02	0.22
6.00	1.50	1.574	1.713	3.820	0.11	0.48
4.00	1.50	2.024	2.974	8.447	0.29	0.84
2.00	1.50	2.474	4.594	15.956	0.60	1.33
0.00	1.50	2.924	6.575	27.067	1.08	1.95

FC MAX FOR STEM= 0.796 KSI BATR= 0.00

FOOTING DESIGN

WIDTH	DEPTH	FSO	FSS	RVERT	RFCC	KSFMX	KSFMN	OM	RM
12.50	2.00	3.61	1.52	22.634	1.33	2.972	0.648	42.499	153.708

TOE RESULTS

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
1.50	2.893	3.782	0.01	0.02	0.05	0.09	0.79	19.974	0.161	0.00

HEEL RESULTS INCLUDE PRESSURE UNDER HEEL

WIDTH	BM	V-SHEAR	A1/4	A1/2	A3/4	ATENS	PER	FS	FC	ACOMS
9.50	34.214	4.481	0.10	0.37	0.72	1.10	0.99	19.967	0.631	0.00

E1

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBCO-S Re: 77-985-20
Town of Greece, NY

23 June 1977

Proj. No.	5782
Original	ELA
Enclosure	
P. B. B.	
E. L. A.	
A. S. P.	
	KA ✓

Kenneth Allen, P.E.
Erdman, Anthony, Associates
P.O. Box 9589
242 Andrews Street
Rochester, NY 14604

Dear Mr. Allen:

Please refer to your letter of 8 June 1977 concerning English Road Park Detention Facility.

I have reviewed the data supplied and our field inspection report and decided that a Department of the Army permit will not be required. The fill area is not a freshwater wetland and the average flow of the waterway does not appear to be above five cubic feet per second as required by the administrative procedures for Section 404 of the Federal Water Pollution Control Act Amendments of 1972.

Thank you for your cooperation in this matter.

Sincerely yours,

L.H. HAIR, Chief
Construction-Operations Division

RECEIVED
JUNE 23 1977
Erdman, Anthony, Associates
ROCHESTER, N. Y.

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
Raymond T. Schuler, Commissioner

E-2

Region 4 Office: 1530 Jefferson Road, Rochester, New York 14623

Proj. No. 5L82
Original QLA
Enclosure
P. E. S.
P. L. A.
A. S. P.
94 KA

May 5, 1977

Erdman, Anthony, Associates
Consulting Engineers and Planners
P. O. Box 9589
242 Andrews Street
Rochester, New York 14604

ATTENTION: Mr. Kenneth Allen

Re: ROCHESTER OUTER LOOP
RIDGE ROAD TO LAKE ONTARIO PARKWAY
P.I.N. 4070.00
ENGLISH ROAD PARK
DETENTION FACILITY

Gentlemen:

This is to acknowledge your letter of April 27, 1977.

A preliminary investigation of the expressway in connection with your proposed detention facility has been made by this office. It was discovered that high water will flood the expressway if provisions are not made for an earth berm in the areas with an elevation of less than 355, your estimate of extreme high water.

This office will approve your permit application if provisions are made in the application to allow the State of New York to do the necessary grading on the Town of Greece Park land, to assure protection for the expressway. This protection will be in the form of a berm with an elevation of 357'±.

Very truly yours,

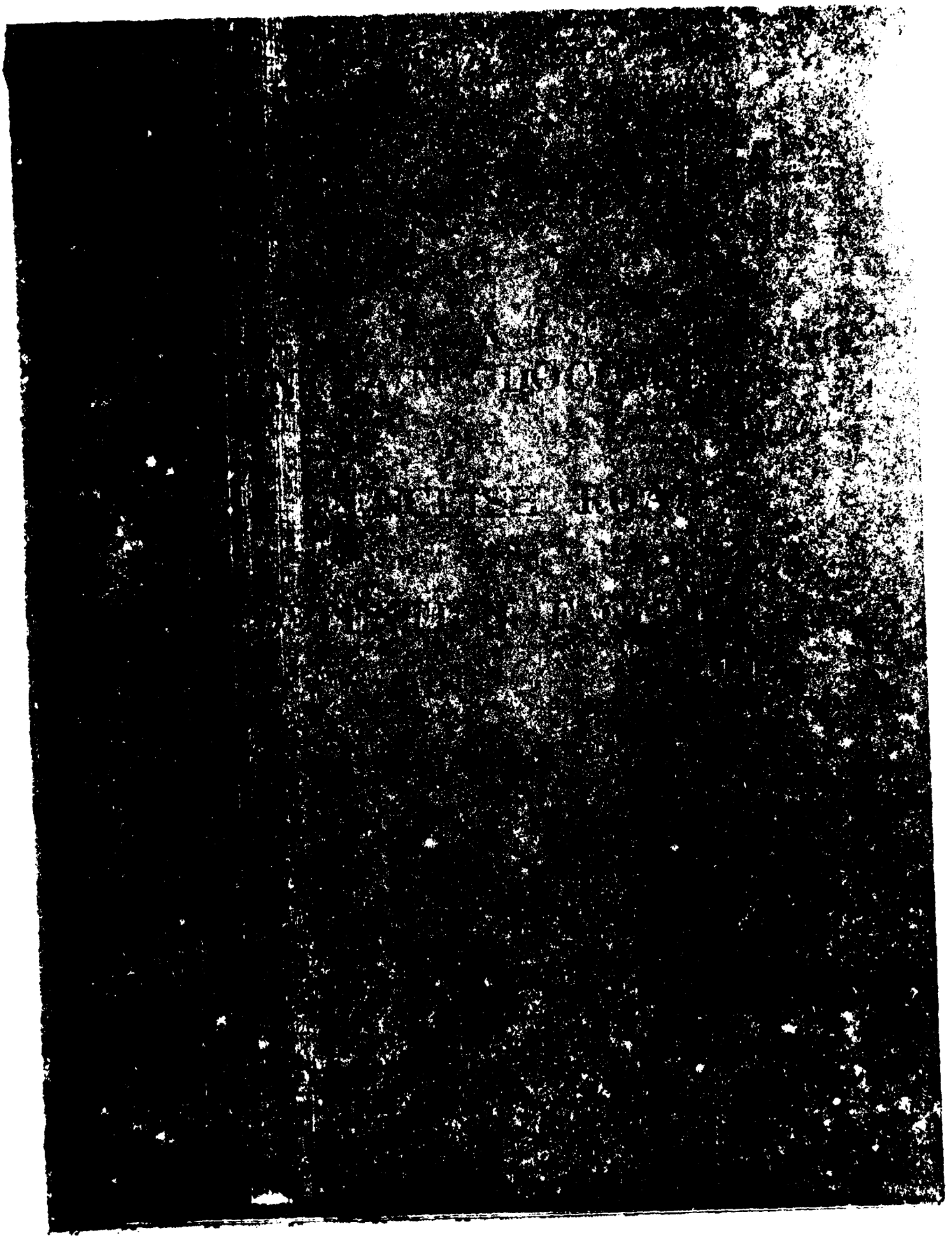
A. J. Kopczynski
Regional Director

By: J. D. TenHagen
Regional Design Engineer

JDTH:AMB:ses

cc: R. B. Tylock, Regional Planning Engineer
Gene Penzimer, Greece Town Engineer

RECEIVED
MAY - 9 1977
Erdman, Anthony, Associates
ROCHESTER, N. Y.



EARTHWORK

Item 203.02, unclassified excavation and disposal, will be paid for all excavations made on this project in accordance with the Contract Documents.

Item 203.03, Embankment in Place, will be paid for all embankments placed on this project in accordance with the Contract Documents.

Excavations and embankments of a temporary nature which are not called for on the plans will not be paid for.

The material utilized in the portions of the dam embankments noted as "Impervious Embankment" shall be graded within the following limits:

Sieve Size U.S. Std. Square Mesh.	Percent Passing by Weight
6"	100
3/4"	90 - 100
No. 4	75 - 95
No. 40	45 - 85
No. 200	25 - 65

It is anticipated that none of the on-site excavations will yield materials which will conform to the required "Impervious Embankment". The Contractor will submit the location of any borrow sources to the Engineer for approval in accordance with Section 203-3.16 of the NYSDOT Standards.

The remaining embankments on the project, outside of the "impervious embankment" areas may be constructed of suitable materials from the excavations. Suitable materials shall be as defined in the NYSDOT Standards, Section 203-1.08.

Any excess of suitable materials from the excavations which are not utilized for construction of embankments shall be stockpiled on the site at a location designated by the owner.

Unsuitable materials from the on-site excavations, as defined by Section 203-1.09 of the NYSDOT Standards, shall be disposed of on-site at the location indicated on the plans.

SUBSURFACE DATA

Subsurface data accumulated by the Engineer has been provided herein. Information obtained from these records is not to be substituted for personal investigation and research by the Contractor. Attention is directed to the paragraph headed "Subsurface Information" in Section 100, Part 102-05 of the NYSDOT Standard Specifications.

PROJECT COMPLETION TIME

A total duration of 300 calendar days from the Notice to Proceed has been specified for completion of all work items of this Contract. A second condition of the Contract shall be that all work items associated with the dam and spillways required to make the project operational for flood control purposes shall be completed within 120 calendar days from the Notice to Proceed.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1777 PAGE 1 OF 2 BORING NO. B-1
PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03
CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK
ELEVATION 256.0 INSPECTOR D. Degear WEATHER
DATE STARTED 4/26/77 COMPLETED 4/27/77 TECHNICIAN D. Sweeting
GROUND WATER – CASING IN – AT COMPLETION / TIME
BELOW SURFACE – CASING OUT – -WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
	6	2	2			4			Loose to firm brown damp fine sand, trace of silt.
	8			3	4	7	1	0'0"-2'0"	3'0"
	10	6	10			16			
	17			14	17	31	2	2'0"-4'0"	Firm to compact brown damp silt, little fine sand, trace of organic matter 4'6"
5	30	17	20			37			
				21	30	51	3	4'0"-6'0"	Dense to very dense brown damp fine sand, trace to little silt. 7'0"
		21	30			51			
				41	56	97	4	6'0"-8'0"	Very dense brown damp silt, little to some fine sand.
		17	30			47			
10				31	33	64	5	8'0"-10'0"	10'0"
		17	19		36				Compact to dense brown damp silt, trace to little fine sand.
				21	24	45	6	10'0"-12'0"	12'6"
		30	75			105	7	12'0"-13'0"	Very dense reddish brown damp fine sandy silt. Little to some medium to fine gravel. 13'6"
		100/0"						13'0"-13'6"	
15									Very dense reddish brown weathered shale and siltstone.
20									
		31	50/3"			81/6"	8	20'0"-20'9"	Very dense reddish brown and black fine gravel and coarse to fine sand. (Appears to be glacial wash).
25		50/1"				50/1"	9	25'0"-25'1"	No Recovery Refusal 25'0"
								Run #1 25'0"-26'4" Rec. 1'4"	Soft to medium hard reddish brown with greenish grey slightly mottled shale and siltstone. Few weathered cones throughout Rock Core. Core in many pieces from chips to 6" long.
								Run #2 26'4"-30'0" Rec. 3'0"	
30									

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 1 3/8" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE 2" CASING 4" WITH 300 LB. WT. 24" EA. BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

ROCHESTER DRILLING COMPANY, INC.

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CONCRETE AND SOIL-TESTING AND INSPECTION

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PROJECT NO. 1777 PAGE 2 OF 2 BORING NO. B-1

PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03

CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK

ELEVATION 256.0 INSPECTOR D. Degear WEATHER

DATE STARTED 4/26/77 COMPLETED 4/27/77 TECHNICIAN D. Sweeting

GROUND WATER - CASING IN - AT COMPLETION / TIME

BELOW SURFACE - CASING OUT - -WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6" 6"/12" 12"/18" 18"/24" N	SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
					Boring terminated at 30'0"
					Notes: Advanced test boring with hollow stem auger casing to 25'0"
					Placed NX Flush coupled casing to 25'0"
					Core drilled with NX Series "M" double tube core barrel and diamond bit from 25'0" - 30'0"
					Performed permeability tests in overburd at 3'0" and 8'0" through 2½" drive pipe casing.

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE 2" CASING 10" WITH 300 LB. WT. 48" EA. BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

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PROJECT NO. 1777 PAGE 1 OF 2 BORING NO. B-3
PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. I-5182-03
CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK
ELEVATION 540.2 INSPECTOR D. DeGear WEATHER
DATE STARTED 4/6/77 COMPLETED 4/6/77 TECHNICIAN J. Hammond
GROUND WATER BELOW SURFACE – CASING IN – ——— – CASING OUT – ——— AT COMPLETION / TIME -WELLPOINT AT
Water Observed During Drilling at 1'6"

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		1	1			2			TOPSOIL 1'0"
				1	2	3	1	0'0"-2'0"	Loose to firm brown damp fine sand little silt, trace of gravel.
		5	6			11			
				10	12	22	2	2'0"-4'0"	
5		33	17	30		47	3	4'0"-5'6"	Dense to firm brown damp fine sand little silt, trace of gravel. 5'6"
					70	70/4	4	5'6"-6'0"	
								Run #1	Very dense reddish brown damp partially weathered shale 6'4"
		DRILL TIME					3.0	6'4"-8'4"	
		MINUTES					3.0	Rec. 2'0"	Soft to medium hard reddish brown with greenish grey slightly mottled shale and siltstone. Some thin to very thick weathered zones from 6'4" to 16'0". Core in many pieces from chips to 15" long
10							3.0	Run #2	
							3.0	8'4"-18'4"	
							2.5	Rec. 9'9"	
							2.0		
							2.0	Run #3	
15							2.0	18'4"-26'4"	
							2.5	Rec. 8'3"	
							2.5		
							3.0		
							3.0		
20							3.0		
							3.0		
							2.5		
							3.0		
							2.5		
25							3.0		
							2.5		
							2.5		26'4"
									Boring terminated at 26'4"
30									

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 1.7" WITH 140 LB WT. 30" EA BLOW
C = NO. OF BLOWS TO DRIVE ——— CASING ——— WITH ——— LB. WT. ——— EA. BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

D21

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

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PROJECT NO. 1777 PAGE 2 OF 2 BORING NO. B-3

PROJECT TOWN OF GREECE -ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03

CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK

ELEVATION 540.2 INSPECTOR D. DeGear WEATHER

DATE STARTED 4/6/77 COMPLETED 4/6/77 TECHNICIAN J. Hammond

GROUND WATER - CASING IN - ——— AT COMPLETION / TIME

BELOW SURFACE - CASING OUT - ——— -WELLPOINT AT

Water Observed During Drilling at 1'6"

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS

NOTES:

Water Pressure Tests

	Head	P.S.I.	Take (min/gal)
1.	25'4" to 26'4" 5'5"	25.5	0
2.	21'4" to 26'4" 4'3"	23.0	0
3.	16'4" to 21'4" 5'8"	20.0	0
4.	11'4" to 16'4" 5'8"	18.0	5/42.0
			5/31.5
			5/33.6
			5/32.7
			5/32.5
5.	10'4" to 15'4" 6'8"	18.0	5/28.7
			5/42.3
			5/36.0
			5/34.0
			5/35.0
			5/31.5

Notes: Advanced test hole with hollow stem auger casing.

Placed NX Flush coupled casing to 6'4" Core drilled with NX Series "M" double tube core barrel and diamond bit from 6'4" to 26'4"

Water pressure tests of rock were made at intervals shown between 6'4" and 26'4". (5/20.0) represents holding test at 5 minutes and rock taking 20.0 gallons per 5 minute interval.

Time it takes to drill one foot of rock is shown in sample number column.

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" FA. BLOW
C = NO. OF BLOWS TO DRIVE CASING WITH LB. WT. FA. BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

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PROJECT NO. 1777 PAGE 1 OF 2 BORING NO. B-4

PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03

CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK

ELEVATION 355.0 ± INSPECTOR D. Degear WEATHER

DATE STARTED 4/27/77 COMPLETED 4/27/77 TECHNICIAN D. Sweeting

GROUND WATER - CASING IN - 19'0" AT COMPLETION / TIME

BELOW SURFACE - CASING OUT - -WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		2	2			4			TOPSOIL 0'5"
				5	7	12	1	0'0"-2'0"	Loose to firm brown damp fine sand, little silt 2'0"
		5	7			12			
				7	8	15	2	2'0"-4'0"	Firm brown damp fine sand and silt. 4'6"
5		5	14			19			
				24	30	54	3	4'0"-6'0"	
		14	15			29			
				17	19	31	4	6'0"-8'0"	Compact brown moist silt, thin very fine sand lenses, trace of very fine sand. 8'0"
		15	20			35			
10				38	42	80	5	8'0"-10'0"	Compact to very dense brown moist fine to very fine sand and silt, Color change Brown to Grey at 11'0" 12'0"
		23	23			46			
				47	41	88	6	10'0"-12'0"	
		12	16			28			Firm brown gray moist fine to very fine sand, little silt, trace of fine gravel and clay, alternating layers of silt and sand. Cobble 14'3" - 16'0" 16'0"
				15	16	31	7	12'0"-14'0"	
15		100/3"				100/3"	8	14'0"-14'3"	
		15	16			31			
				28	60	88	9	16'0"-18'0"	Compact to very dense reddish brown damp coarse to fine sand and silt, little coarse to fine gravel, trace of clay. 19'0"
		16	17			33			
20				100/6"			10	18'0"-19'6"	Water at 19' Very dense reddish damp weathered and decomposed shale and shale fragments.
									Refusal with Auger 23'6" 24'0"
								Run #1	
25			DRILL TIME MINS/FOOT				12	24'0"-29'0"	Soft to medium hard reddish brown with greenish grey slightly mottled shale and siltstone. Few weathered cones throughout rock core. Core in many pieces from chips to 7" long.
							5		
							3	Rec. 4'10"	
							3		
							3	97%	29'0"
30									Boring terminated at 29'0"

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 2" WITH 140 LB. WT 30" FA BLOW
C = NO. OF BLOWS TO DRIVE ____ CASING ____ WITH ____ LB. WT ____ FA BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

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PROJECT NO. 1777 PAGE 2 OF 2 BORING NO. B-4

PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03

CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK

ELEVATION 255.0 ± INSPECTOR D. Degear WEATHER

DATE STARTED 4/21/77 COMPLETED 4/27/77 TECHNICIAN D. Sweeting

GROUND WATER - CASING IN - 19'0" AT COMPLETION / TIME

BELOW SURFACE - CASING OUT - -WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
									Notes: Advanced test boring with hollow stem auger casing to 23'6" Advanced test boring with NX Flushed coupled casing to 24'0" Core drilled with NX Series "M" double tube core barrel and diamond bit from 24'0" to 29'0" Performed one permeability test in overburden at 3'0" through 2½" drive pipe casing.

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" FA. BLOW
C = NO. OF BLOWS TO DRIVE CASING WITH LB WT EA BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

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PROJECT NO. 1777 PAGE 1 OF 2 BORING NO. B-5
PROJECT TOWN OF GREECE -ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03
CLIENT ERIMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK
ELEVATION 362.5 INSPECTOR D. DeGear WEATHER
DATE STARTED 3/31/77 COMPLETED 3/31/77 TECHNICIAN J. Hammond
GROUND WATER BELOW SURFACE – CASING IN – 19'0" AT COMPLETION 3/31 TIME
– CASING OUT – 9'6" 3/31/77 –WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		1	1			2			Loose brown damp fine sand, little silt.
				1	1	2	1	0'0"-2'0"	
		6	12			18			Firm brown damp fine sand, little silt.
				12	13	25	2	2'0"-4'0"	
5		10	13			23			
				14	12	26	3	4'0"-6'0"	
		12	12			24			
				12	12	24	4	6'0"-8'0"	
		12	20			32			
10				26	27	53	5	8'0"-10'0"	
		28	36			64			
				60	58	118	6	10'0"-12'0"	11'6" Very dense brown damp fine gravel, some silt, trace to little coarse to fine sand. 13'0"
		32	38			70			
				44	46	90	7	12'0"-14'0"	Very dense brown wet medium to fine sand, trace of silt.
15		22	25			47			
				24	24	48	8	14'0"-16'0"	17'6"
		18	18			36			
				20	27	47	9	16'0"-18'0"	Dense reddish brown wet silty fine sand, some shale gravel.
		20	12			32			
20				33	34	67	10	18'0"-20'0"	21'0"
		70	72			142			WEATHERED SHALE 21'6"
				92	52	144	12	20'0"-22'0"	
		100/1"				100/1"	13	22'0"-22'1"	Very dense reddish brown damp shale gravel and sand, little silt.
		100/5"				100/5"	14	24'0"-24'5"	
25								Run #1	No Recovery Refusal 26'0"
		DRILL RATE					5.0	26'0"-28'0"	Soft to medium hard reddish brown with greenish grey slightly mottled shale and siltstone. Some thin to thick weathered zone throughout rock core
		MINS/FOOT					2.5	Rec. 1'9"	
							3.0	Run #2	
30								28'0"-30'0"	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT 30" FA. BLOW
C = NO. OF BLOWS TO DRIVE CASING WITH LB. WT. EA. BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE RECORDED DATA.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

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PROJECT NO. 1777 PAGE 2 OF 2 BORING NO. B-5

PROJECT TOWN OF GREECE -ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03

CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK

ELEVATION 362.5 INSPECTOR D. DeGear WEATHER

DATE STARTED 3/31/77 COMPLETED 3/31/77 TECHNICIAN J. Hammond

GROUND WATER - CASING IN -19'0" AT COMPLETION 3 / 33 TIME

BELOW SURFACE - CASING OUT -9'6" 3/31/77 -WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
							2.5	Rec. 6'0"	Core in many pieces from chips to 10" long.
							2.5	Run #3	
							2.5	34'0"-36'0"	
							2.0	Rec. 2'0"	
35							2.5		
							4.0		36'0
									Boring terminated at 36'0"

Notes: Advanced test hole with hollow stem auger casing to 24'5"

Placed NX Flush coupled casing to 26'0"

Core drilled with NX Series "M" double tube core barrel and diamond bit from 26'0" - 36'0"

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 1.3" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE CASING WITH LB. WT. EA. BLOW

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1777 PAGE 1 OF 3 BORING NO. B-6

PROJECT TOWN OF GREECE -ENGLISH ROAD E. & A. PROJECT NO. I-5182-03

CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK

ELEVATION 343.9 INSPECTOR D. DeGear WEATHER

DATE STARTED 4/5/77 COMPLETED 4/5/77 TECHNICIAN J. Fannon

GROUND WATER – CASING IN – AT COMPLETION / TIME

BELOW SURFACE – CASING OUT – 1'0" -WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		1	1			2			
				3	7	10	1	0'0"-2'0"	Firm reddish brown wet silty fine sand, little gravel. 2'6"
		6	9			15			
				10	10	20	2	2'0"-4'0"	Firm to compact reddish brown silty fine sand and shale gravel.
5		8	24			32			
				12	14	26	3	4'0"-6'0"	6'6"
		16	48			64			
				75		75	4	6'0"-7'6"	Weathered Shale 8'3"
							1.0	Run #1	Soft to medium hard reddish brown with greenish
10			DRILL TIME				3.0	8'3"-11'0"	grey slightly mottled shale and siltstone. Some
			MINS/FOOT				3.0	Rec. 2'7"	thin to thick weathered zones throughout rock
							1.5		core. Core in many pieces from chips to 13"long.
							3.0	Run #2	
							2.5	11'0"-21'0"	
15							2.5	Rec. 10'0"	
							2.5		
							2.5	Run #3	
							3.0	21'0"-28'3"	
							2.5	Rec. 7'0"	
20							2.5		
							2.5		
							2.5		
							2.5		
							2.5		
25							2.5		
							2.5		
							2.5		
							3.0		
							3.0		28'3"
30									Boring terminated at 28'3"

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE ____ CASING ____ WITH ____ LB. WT. ____ EA. BLOW

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1777 PAGE 2 OF 3 BORING NO. B-6

PROJECT TOWN OF GREECE - ENGLISH ROAD E. & A. PROJECT NO. 1-5182-03

CLIENT ERDMAN, ANTHONY ASSOCIATES, ROCHESTER, NEW YORK

ELEVATION 343.9 INSPECTOR D. DeGear WEATHER

DATE STARTED 4/5/77 COMPLETED 4/5/77 TECHNICIAN J. Hammond

GROUND WATER - CASING IN - ——— AT COMPLETION / TIME

BELOW SURFACE - CASING OUT - 1'0" -WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS

Notes:

Water Pressure Tests

	Head	P.S.I.	Take (min/gal.)
1. 27'3" to 28'3"	3'6"	27.0	5/0.9
			5/0.4
			5/0.4
2. 23'3" to 28'3"	2'5"	25.0	0
3. 18'3" to 23'3"	2'6"	20.0	5/2.6
			5/4.6
			5/14.7
			5/14.5
			5/14.2
4. 13'3" to 18'3"	2'5"	20.0	0
5. 16'3" to 21'3"	1'6"	20.0	5/7.0
			5/9.8
			5/11.4
			5/12.6
			5/13.0
6. 10'3" to 15'3"	5'7"	18.0	5/23.6
			5/28.6
			5/28.8

Notes: Advanced test hole with hollow stem auger casing to 7'6"

Placed NX Flush coupled casing to 8'3" Core drilled with NX Series "M" double tube core barrel and diamond bit from 8'3" to 28'3"/

Water pressure tests of rock were made at intervals shown between 8'3" and 28'3" (5/20.0) represents holding test at 5 minutes and rock taking 20.0 gallons

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 1 3/8" WITH 140 LB WT. 30" FALL
C = NO. OF BLOWS TO DRIVE ——— CASING ——— WITH ——— LB. WT. ——— FALL

NOTE: WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

Typical Inspection Checklist
for English Rd, St. Andrews Drive & Fountain Hills

ST. ANDREWS DRIVE DETENTION BASIN
INSPECTION
CHECK LIST

DATE: 11/18/80

TIME: 11:45

INSPECTED BY: BJ.

ITEMS TO BE CHECKED

1) GATE AT ST. ANDREWS DRIVE:

O.K.

2) GATE AND LOCK AT CONTROL STRUCTURE:

O.K

3) OPENING HEIGHT OF CONTROL GATE:

EXISTING HEIGHT:	CHANGED TO:
0.75'	

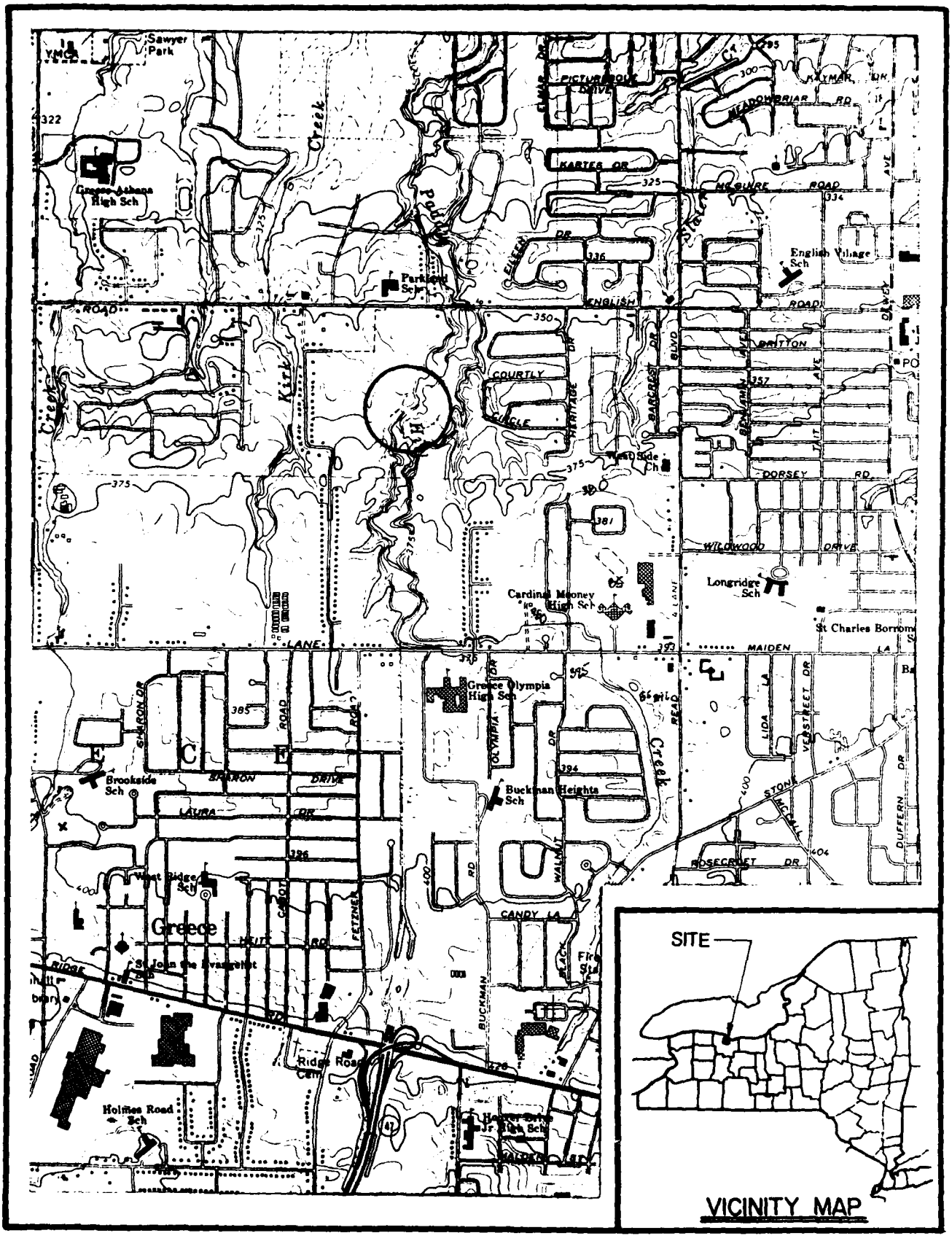
4) COMMENTS:

Slight vibration when control arm is lowered. No serious problem.

8/18/77

APPENDIX F

DRAWINGS



LOCATION PLAN

SCALE 1:2000

1000 0 1000 2000 3000 4000

N

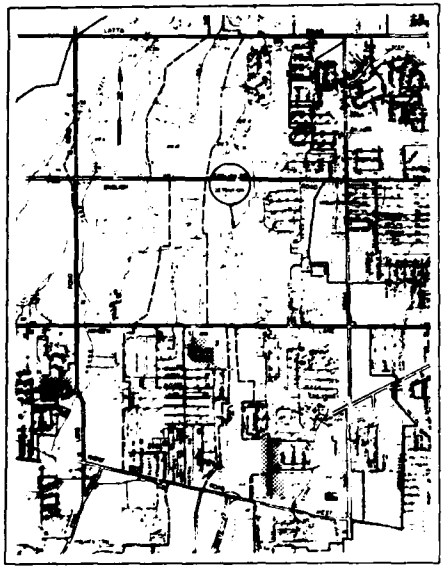
FIGURE 1

CONTRACT DRAWINGS FOR THE

ENGLISH ROAD

DETENTION FACILITY

Town of Greece, Monroe County, New York



LOCATION PLAN
SCALE 1" = 2000'

TOWN SUPERVISOR: Donald J. Riley

TOWN BOARD: Joseph N. Dorweesh
Howard Genano
Roger W. Boily
George R. Tobin

APPROVED BY:

Town Engineer _____ Eugene F. Manzimer, P.E. Date 4/11/11

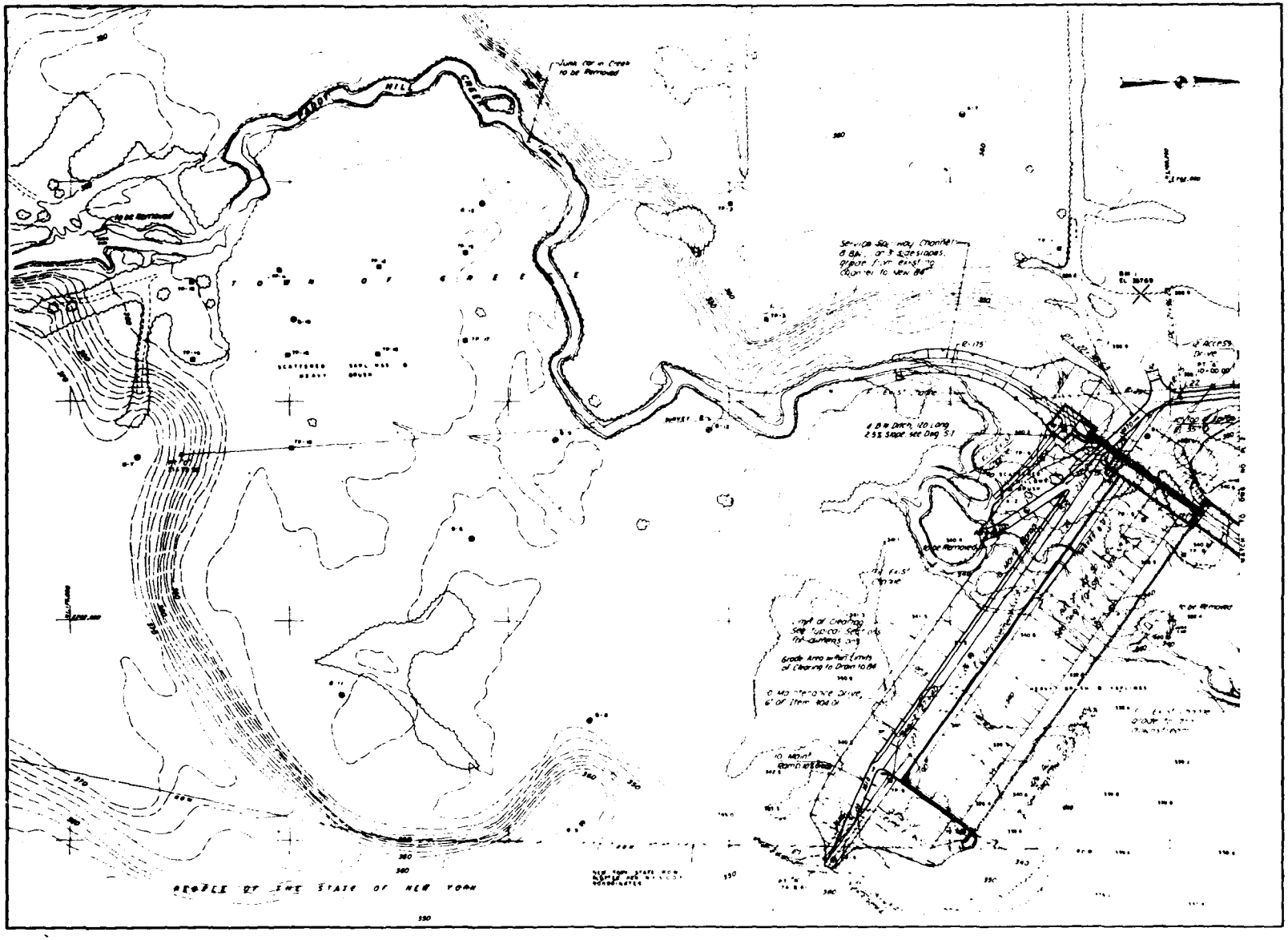
Commissioner of Public Works _____ William Kintz Date 4/11/11

APPROVAL RECOMMENDED BY:

Erdman, Anthony, Associates _____ Date 4/8/11

40A 4294 ~~Greece~~
D.L.R. Ontario

FIGURE 2



ENGINEERING ASSOCIATES

CONSULTING ENGINEERS & PLANNERS

ROCHESTER, N.Y. CAMP HILL, PA.

DATE DATE

NOTE

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REVISIONS

NO.	DATE	DESCRIPTION	REV.	CK'D

PROJECT NAME

ENGLISH ROAD
DETENTION FACILITY

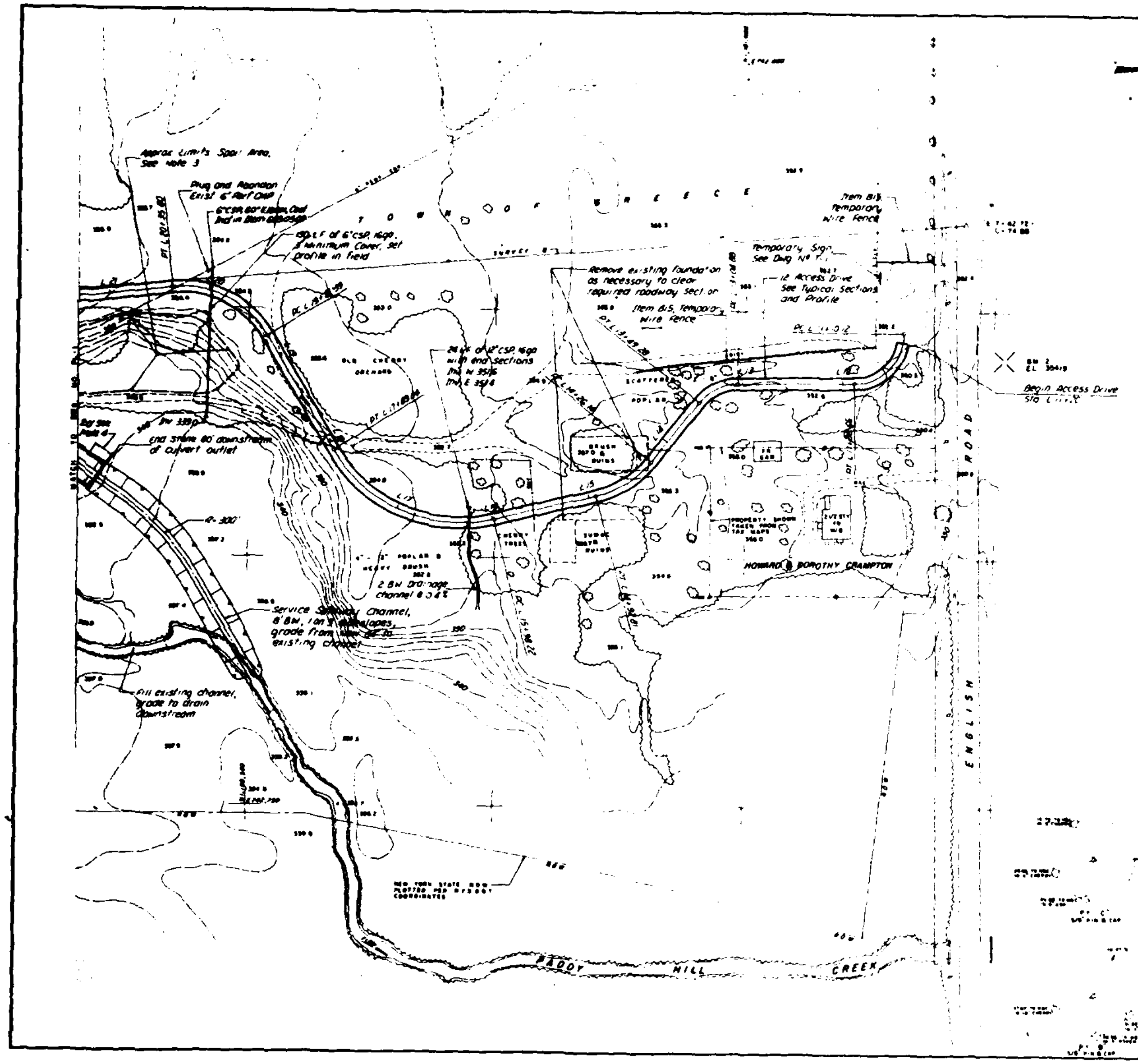
CLIENT

TOWN OF GREECE, N.Y.

DRAW NO. TITLE

SITE PLAN

FIGURE 3



NOTES

1. Refer to Contract Documents for special conditions of the contract
2. The location and elevation of test pits in the flood plain are approximate only
3. Spoil area to be used for tree debris and unsuitable materials from the on site excavations. Maximum finished slope to be 1 on 3
4. Transition side slope of Ditch from 1 on 2 to 1 on 3

NOTE

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REVISIONS			
NO.	DATE	DESCRIPTION	REV.

PROJECT NAME

ENGLISH ROAD DETENTION FACILIT

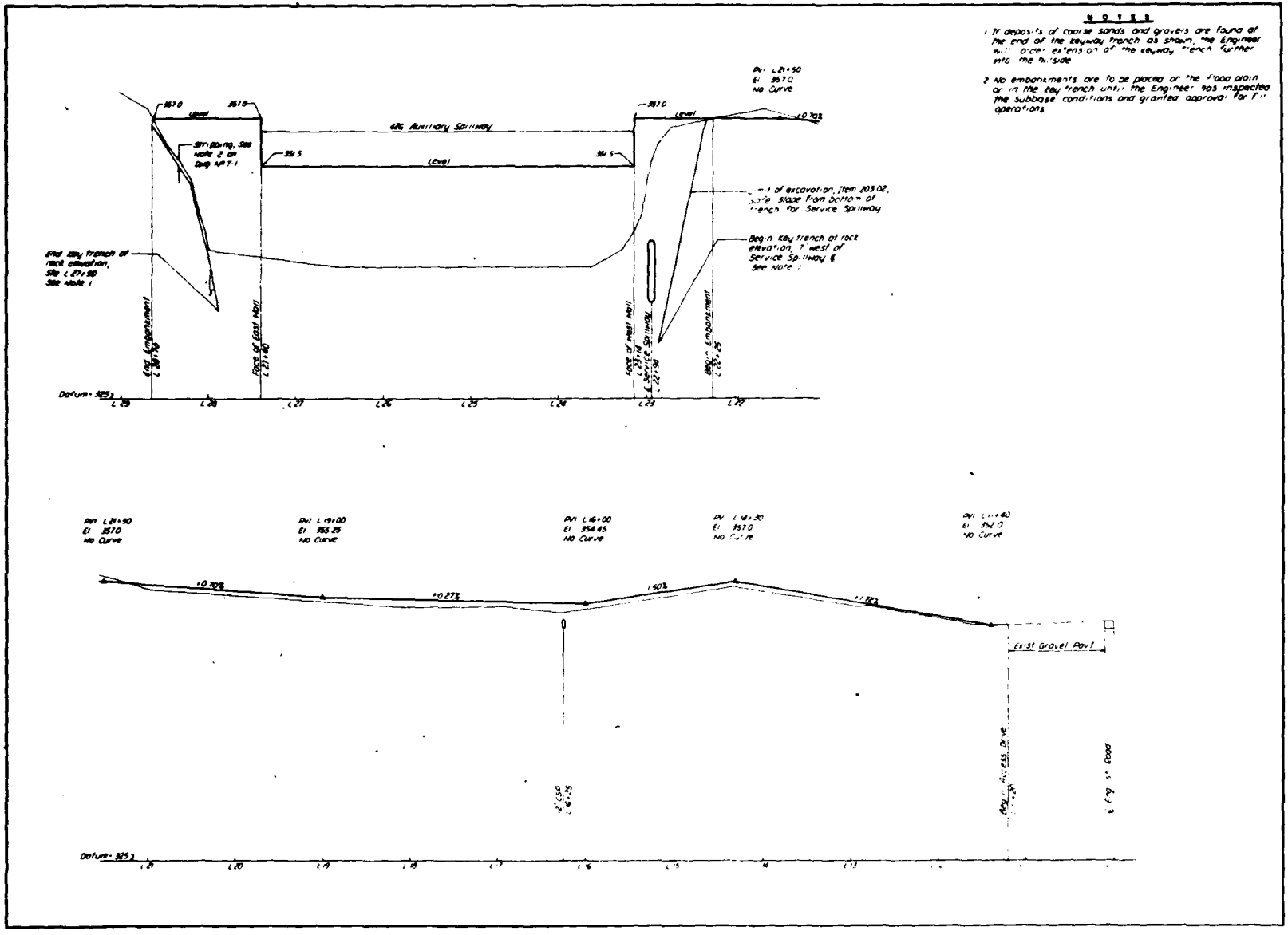
CLIENT

TOWN OF GREECE, N

DRAWING TITLE

SITE PLAN

FIGURE



EA
ENGINEERING, P.C.
AUTHORITY
ASSOCIATES
CONSULTING ENGINEERS & PLANNERS
ROCHESTER, N.Y.

DATE

DATE

NOTE

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REVISIONS

NO	DATE	DESCRIPTION	REV	CK

PROJECT NAME

ENGLISH ROAD DETENTION FACILI

CLIENT

TOWN OF GREECE, N

DRAWING TITLE

PROFILE

SCALE

DES. BY R.A.

DRAWING

HORIZ. 1" = 50'

VERT. 1" = 5'

CH. BY S.E.P.

DATE ISSUED

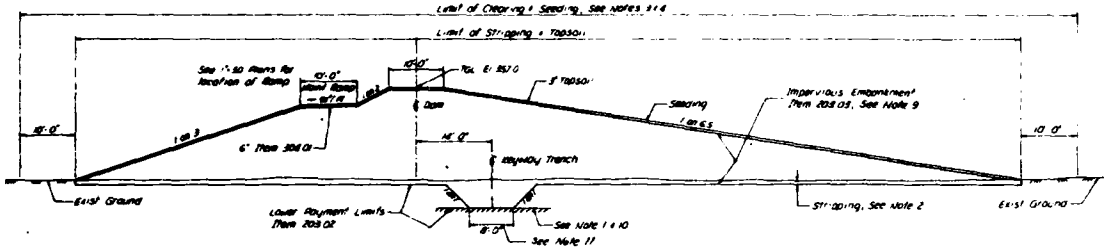
PLOTTED

CK'D BY E.C.T.

SHEET NO

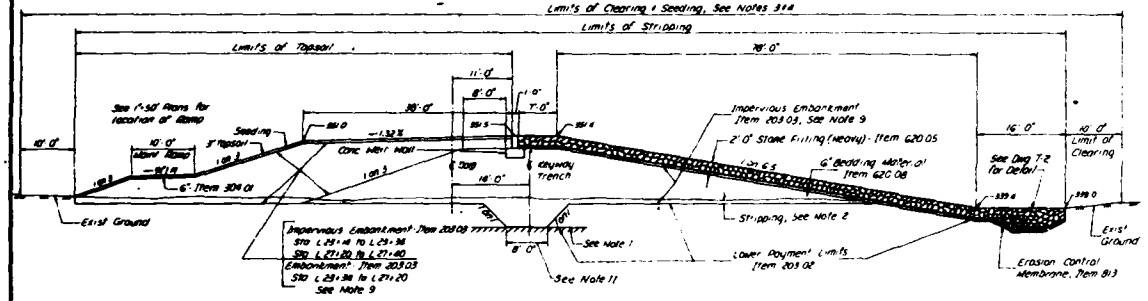
5 OF

FIGURE



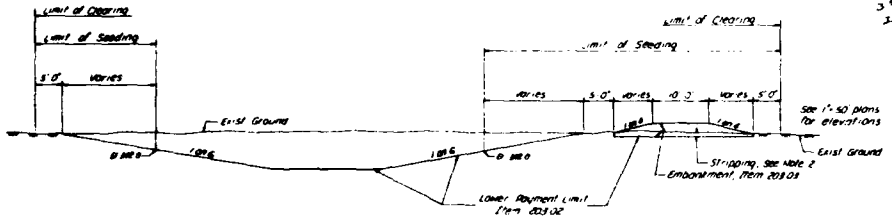
TYPICAL SECTION Nº 1

STA. L 22+25 to L 23+14
STA. L 27+40 to L 28+70



TYPICAL SECTION Nº 2

STA. L 23+14 to L 27+40



TYPICAL SECTION Nº 3

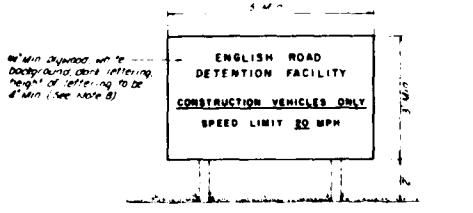
PERMANENT POND AREA
(NOT IN CONTRACT)

NOTES

1. Keyway trench to be excavated to rock. Remove all shattered and disintegrated rock. Fill surface fissures with cement grout. Cost of grouting included in earthwork items.
2. Stripping shall remove all unsuitable material such as topsoil, sod, etc. as defined in Section 203.1.08 of the N.Y.S.D.O.T. Standards.
3. No restoration items, as shown in Table "A" will be required on exposed surfaces of stone filling or road base.
4. Limits of topsoil and seeding shown on typical sections are payment limits. Areas outside these limits disturbed by the contractor are to be restored at his expense.
5. See profiles for detail of embankment tie-in to high ground.
7. The engineer may specify trees to be saved within this width.
8. Cost of temporary sign to be included in general payment items provided in contract.
9. See special conditions of Contract Documents for gradation requirements of embankment materials.
10. See profiles for limits of key trench.
11. If deposits of course sand and gravel are exposed in the key trench, the trench shall be widened to a bottom width of 20', holding the 1:1 as shown on the section.

TABLE "A" - RESTORATION SCHEDULE

TYPE	LOCATION	SEEDING ITEM 610.02	MULCH ITEM 610.04	SOIL CONDITIONERS ITEM 610.01	TOPSOIL ITEM 641.301
I	Sta L 22+25 to Sta L 28+70, dam embankment areas and channel excavations	70 lbs pure live seed per acre	2 Ton/Acre	800 lbs/acre, Type 5 at time of seeding. 2000 lbs/acre lime. Stone at time of seeding. 800 lbs/acre Type 3 at 40-60 days after seeding or ASAP.	3"
II	Access Drive, Maintenance Drive, Sod areas, and other disturbed areas outside dam embankment areas	70 lbs pure live seed per acre	2 Ton/acre	800 lbs/acre, Type 2 at time of seeding	None Required



TEMPORARY CONSTRUCTION ACCESS SIGN

NO SCALE

EDGEAR ASSOCIATES

CONSULTING ENGINEERS & PLANNERS
ROCHESTER, N.Y.

NOTE:
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REVISIONS

NO	DATE	DESCRIPTION	REV

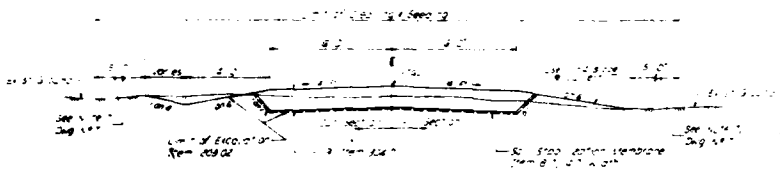
PROJECT NAME
ENGLISH ROAD DETENTION FACIL

CLIENT
TOWN OF GREECE, N

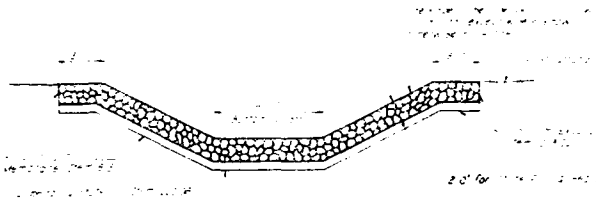
DRAWING TITLE
TYPICAL SECTION

SCALE	DES BY	DRAWING
1" = 10'	DR BY S.E.P.	T-
DATE ISSUED	CHD BY E.C.T.	SHEET
7-10-77	DATE	8

FIGURE

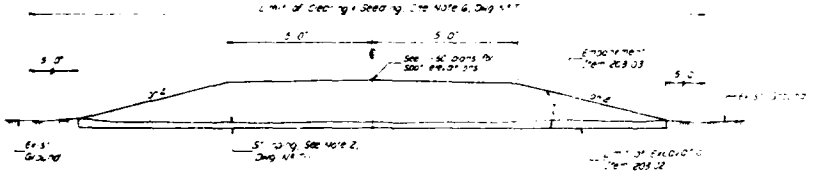


TYPICAL SECTION Nº 4
STA L11+20 to L22+45

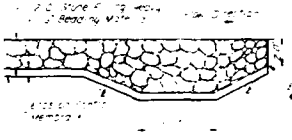


TYPICAL SECTION Nº 7
STONED LINED CHANNEL

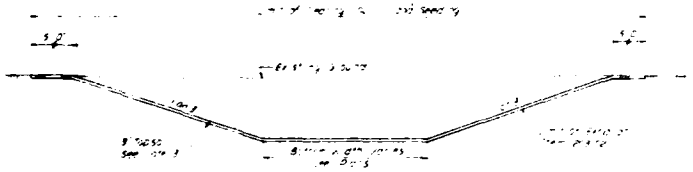
NOTES



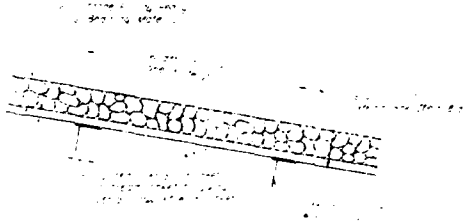
TYPICAL SECTION Nº 5
MAINTENANCE DRIVE IN FLOODPLAIN
(NOT IN CONTRACT)



DETAIL - DOWNSTREAM TOE OF AUX. SPILLWAY



TYPICAL SECTION Nº 6
UNLINED EARTHEN CHANNEL



DETAIL - AUXILIARY SPILLWAY PROTECTION

EDDMAN ARTHORY ASSOCIATES
CONSULTING ENGINEERS & PLANNERS
ROCHESTER N.Y. CAMP HILL PA

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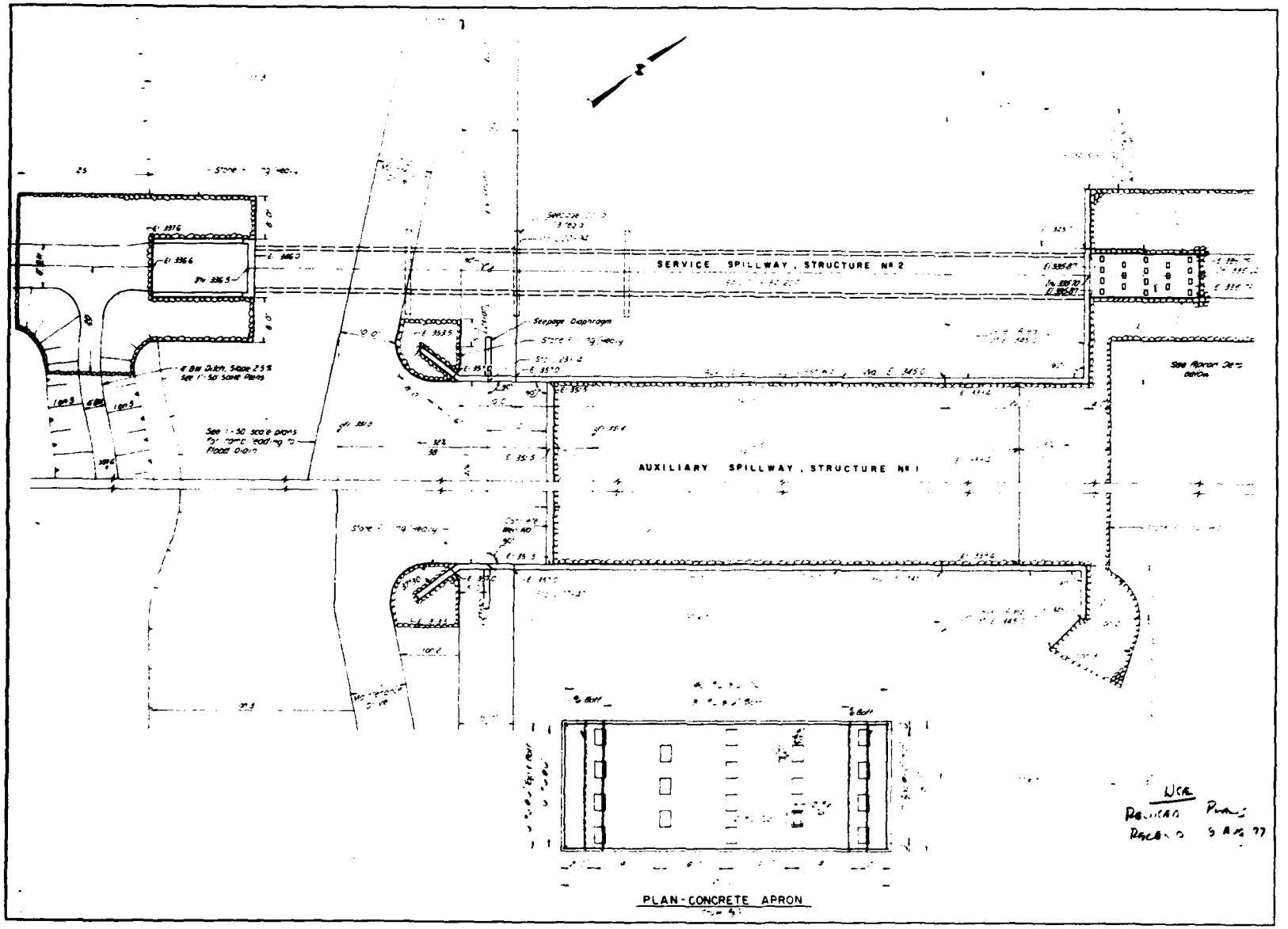
REVISIONS
NO. DATE DESCRIPTION

PROJECT NAME
ENGLISH ROAD DETENTION FACILITY

CLIENT
TOWN OF GREECE N.Y.

DRAWING TITLE
TYPICAL SECTIONS

FIGURE 7



EDAW
ANTHONY
ASSOCIATES

CONSULTING ENGINEERS & PLANNERS
ROCHESTER N.Y. CAMP HILL PA

DATE DATE

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REVISIONS

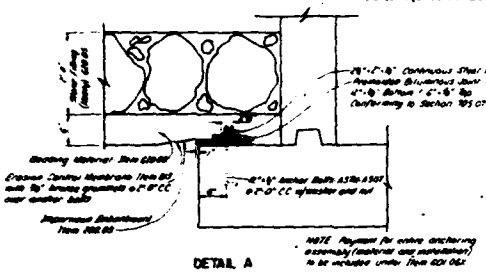
NO.	DATE	DESCRIPTION	REL. BY
1		Spillway Apron ECF	

PROJECT NAME
ENGLISH ROAD
DETENTION FACILIT

CLIENT
TOWN OF GREECE, N.Y

DRAWING TITLE
GENERAL PLAN
STRUCTURES Nº 1 & 2

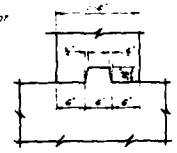
FIGURE 1



DETAIL A

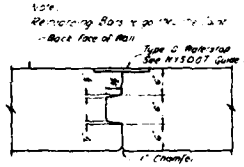
ANCHORAGE OF EROSION CONTROL MEMBRANE TO WALL FOOTING

SCALE 1"=1'-0"



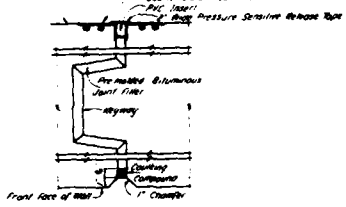
WALL STEM ON FOOTING KEYWAY DETAIL

SCALE 1"=1'-0"



WALL STEM CONSTRUCTION JOINT DETAIL

SCALE 1"=1'-0"

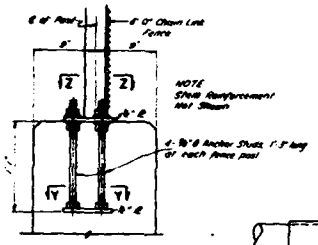


WALL STEM EXPANSION JOINT DETAIL

SCALE 1"=1'-0"

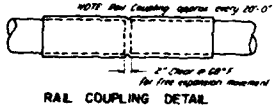
CHAIN LINK FENCE NOTES

1. End posts, corner posts and posts adjacent to expansion joints shall be 2 7/8" O.D. galvanized steel pipe. All other intermediate posts shall be 2 1/2" O.D. galvanized steel pipe.
2. Steel posts, plates, rails, braces and fittings shall conform to N.Y.S.D.O.T. Material Specifications 710-10.01
3. Fabric shall conform to N.Y.S.D.O.T. Material Specifications 710-02 Galvanized Steel Fence Fabric.
4. Fabric is connected: (a) to line posts with 6 ga. wire every 12"; (b) to end posts, corner posts and posts adjacent to expansion joints by using 1/4" x 3/4" flat stretcher (tension) bars tied to the posts every 12" with 1/8" x 7/8" wide steel bands and 3/8" ø bolts and nuts; (c) to top and bottom rails with 6 ga. wire every 2'-0".
5. At terminal fence panels and at panels adjacent to corner posts use intermediate rails and 3/8" ø diagonal rods with turnbuckles.
6. All rails shall be 1 1/8" nominal (1.66" O.D.) galvanized steel pipe.
7. Reference is made to N.Y.S.D.O.T. Standard Structural Details 607-1
8. Fence posts to be 8'-0" center to center.



CHAIN LINK FENCE ANCHORAGE DETAILS

SCALE 1 1/2"=1'-0"



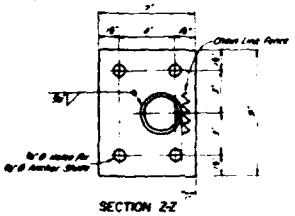
RAIL COUPLING DETAIL

NO SCALE

STANDARD STRUCTURE NOTES

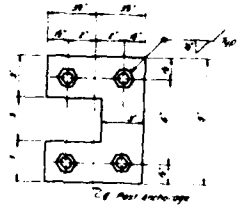
1. Material and Construction Specifications. Specifications of the New York State Department of Transportation dated January 2, 1973, with current additions and modifications.
2. All concrete shall conform to NYSDOT Class "B", Item 601.05. All concrete structures have been designed for a 28 day concrete strength of 3000 PSI. Prior to any concrete pours, the Engineer shall test aggregate samples and one test cylinder provided by the contractor's supplier. The Engineer may elect to periodically take test cylinders on concrete pours during the course of the project.
3. All bar reinforcement for concrete shall conform to Item 602.3701, with a yield strength of 60,000 psi.
4. Payment for all concrete shall be made under Item 601.065. This item shall include the cost of concrete, bar reinforcement, anchor bolts, and other miscellaneous metals, except aluminum appurtenances.
5. Details of reinforcement not specifically shown shall be in conformance with A.C.I. Standard 318-71.
6. All exposed edges of concrete shall be chamfered 1".
7. The following minimum cover dimensions shall be required for all bar reinforcement in structural concrete:

   Footing pours against Earth 3"
   Footing pours against form work 2"
   Stem pours 2"
8. The cost of all joint material will be included in the price bid for the various items of the Contract, except as otherwise specified.
9. All anchor bolts, nuts, and washers shall be galvanized in accordance with the requirements of Section 719-01, Type II.
10. Bituminous material, Item 622.01 shall be applied to the backs of all walls above top of footings where fill is in contact with the walls.
11. When footings are on rock, all disintegrated or shattered material shall be removed to the lines and levels ordered by the Engineer. Where sound rock is found 2 feet or less below the planned levels of the bottom of the footings, backfill of Class B Concrete shall be installed to the levels shown on the plans. Where sound rock is found to be more than 2 feet below the planned levels, the Engineer shall be so advised and a redesign of the substructure made. Payment for the additional concrete and bar reinforcement, if used, will be made at the unit price bid for these items. Rock removed below the levels ordered by the Engineer and outside the neat lines must be replaced as indicated above and as directed by the Engineer for which no payment will be made.
12. All embankments shall be compacted to not less than 95% of Standard Proctor Maximum Density.
13. For design purposes the foundation pressure does not exceed 4 tons per sq foot.
14. All reinforcing steel bar laps to be 24 diameters long.
    All reinforcing steel embeddment to be 12 diameter long.



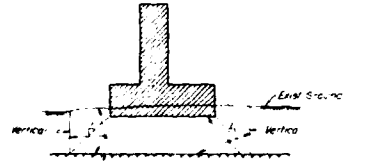
SECTION Z-Z

SCALE 3"=1'-0"



SECTION Y-Y

SCALE 3"=1'-0"



EXCAVATION AND BACKFILL DETAIL RETAINING WALLS

NO SCALE

EDWARD ANTHONY ASSOCIATES

CONSULTING ENGINEERS & PLANNERS

ROCHESTER, N.Y. CAMP HILL, PA.

11/28/77

DATE

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REVISIONS

NO.	DATE	DESCRIPTION	REV.	CHK'D

PROJECT NAME

ENGLISH ROAD DETENTION FACILITY

CLIENT

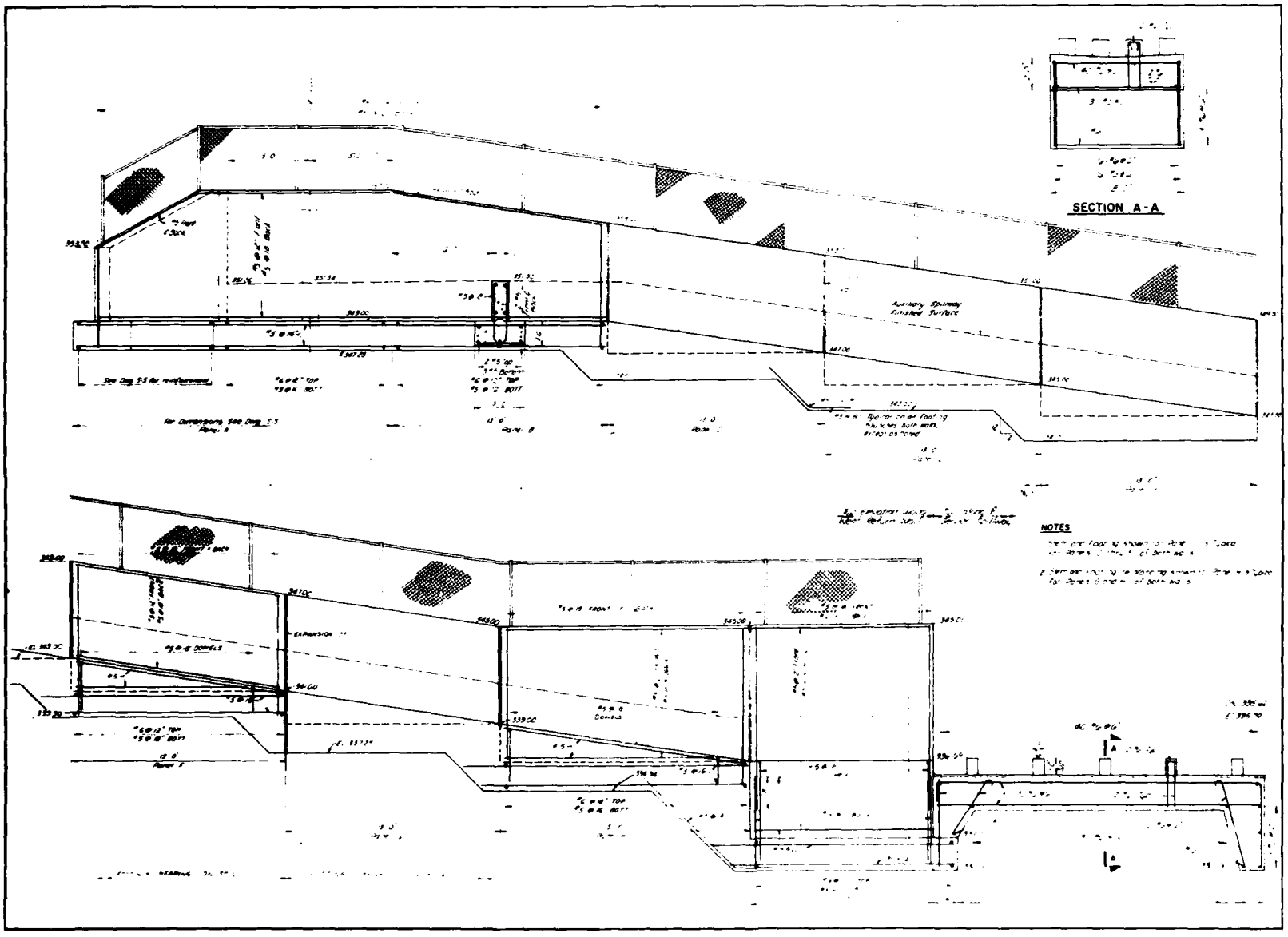
TOWN OF GREECE, N.Y.

DRAWING TITLE

STRUCTURAL DETAILS

DRAWING NO.	S-2
SHEET NO.	

FIGURE 9



ERDMAN ANTHONY ASSOCIATES
CONSULTING ENGINEERS & PLANNERS
ROCHESTER, N.Y. CAMP HILL, PA

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REVISIONS

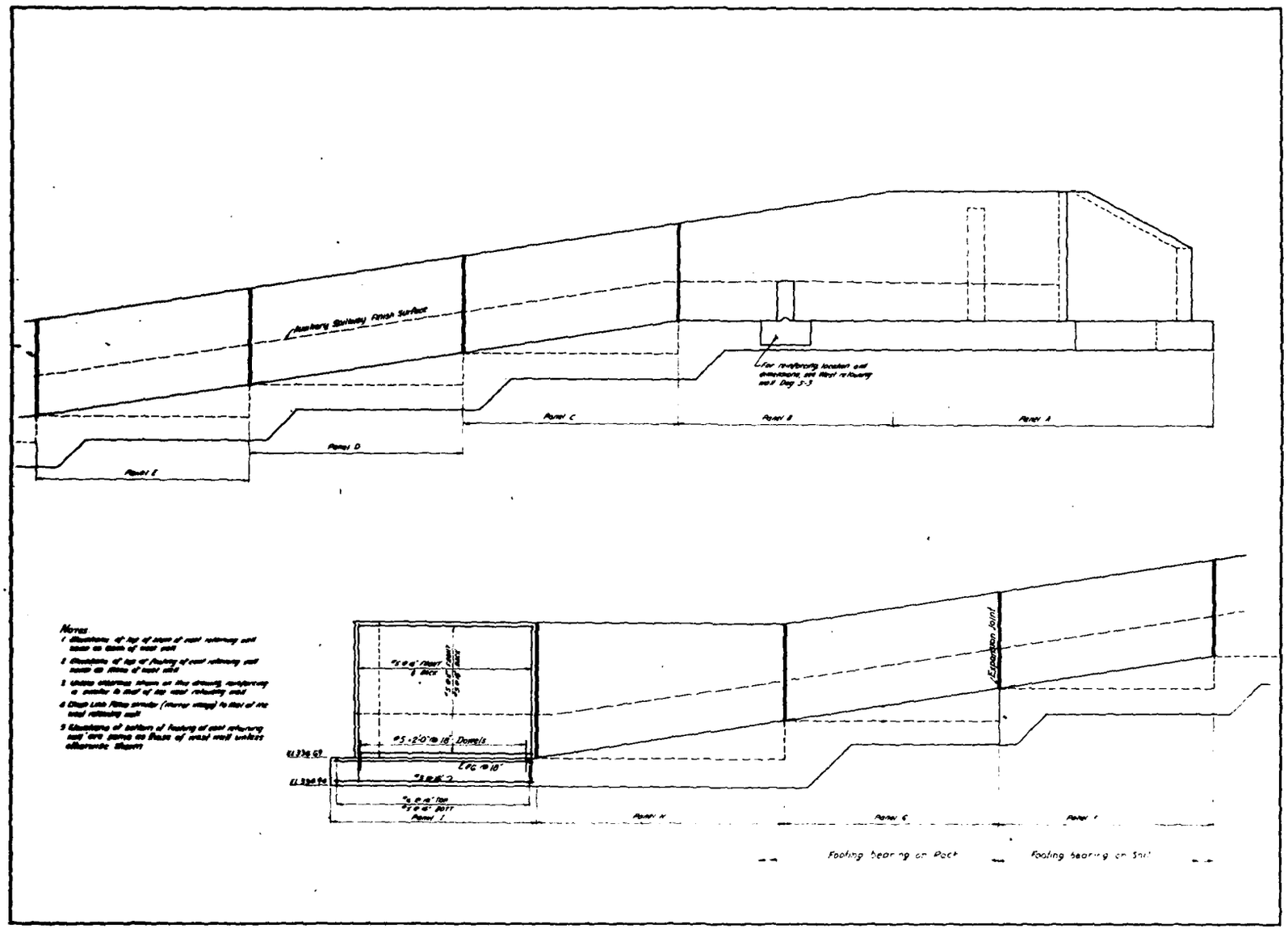
USA Regional Shaft Revised 8 Aug 77

PROJECT NAME
ENGLISH ROAD DETENTION FACILITY

CLIENT
TOWN OF GREECE, N.Y.

DRAWING TITLE
STRUCTURE NC
WEST WALL ELEVATION

FIGURE 10



Notes

1. Elevations of top of stem of east retaining wall taken at base of roof slab
2. Elevations of top of footing of east retaining wall taken at fillets of roof slab
3. Unless otherwise shown on the drawing, reinforcing in members & roof of box wall retaining wall
4. Chain Link fence omitted (fence weight) to top of the wall retaining wall
5. Elevations of bottom of footing of east retaining wall are same as those of west wall unless otherwise shown

ERDMAN ANTHONY ASSOCIATES

CONSULTING ENGINEERS & PLANNERS

ROCHESTER, N.Y. CAMP HILL, PA.

11 JUL 77

DATE

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REVISIONS

NO.	DATE	DESCRIPTION	BY	CK

PROJECT NAME

ENGLISH ROAD DETENTION FACILI

CLIENT

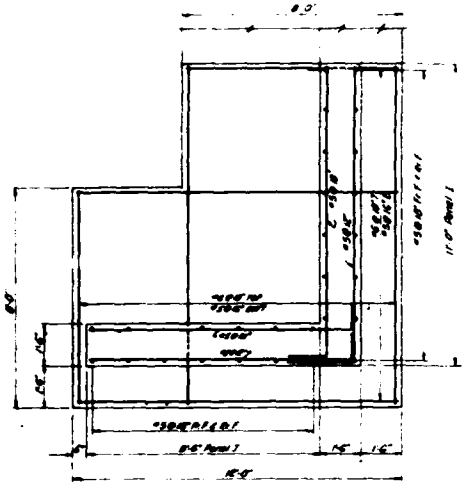
TOWN OF GREECE, N

DRAWING TITLE

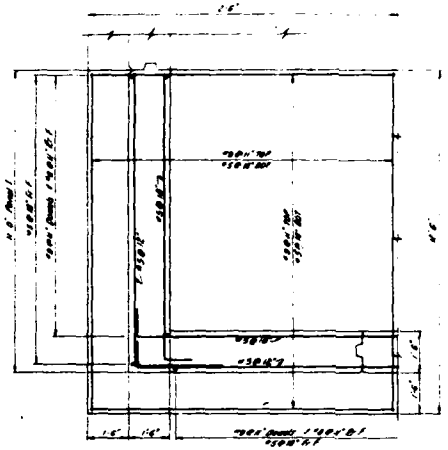
STRUCTURE NO 1
EAST WALL ELEVATION

SCALE	DESIGNED	DRAWING
3/8"=1'-0"	JRS	S-6
DATE	DRAWN	SHEET NO.
7-14-77	JRS	

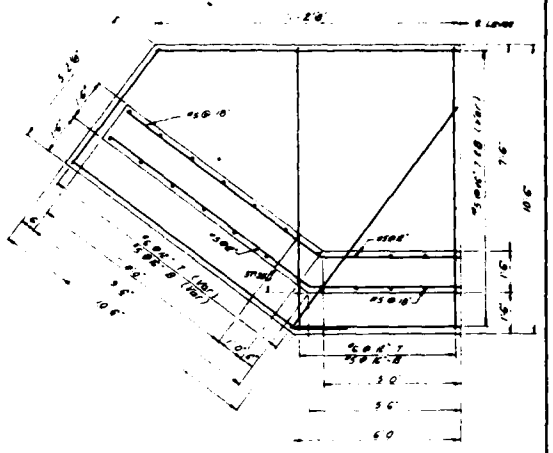
FIGURE



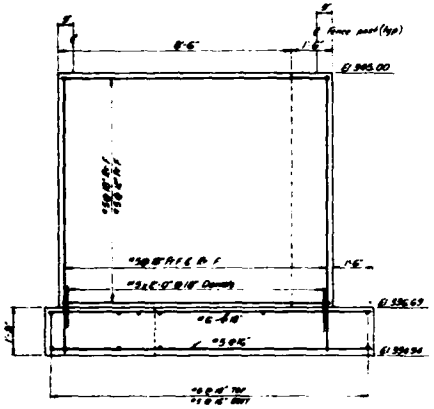
PLAN VIEW AT
NORTH EAST WINGWALL
SCALE 1/2"=1'-0"



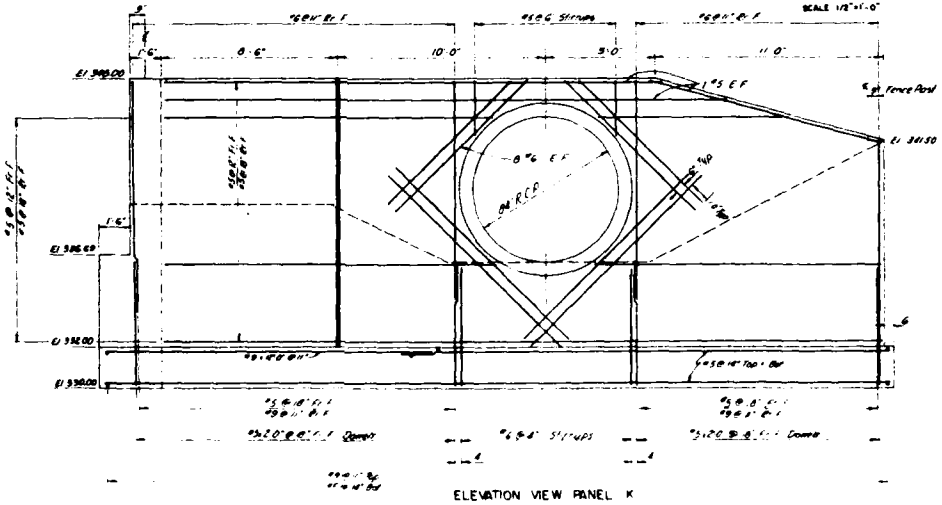
PLAN VIEW AT
NORTH WEST WINGWALL
SCALE 1/2"=1'-0"



PLAN VIEW AT
SOUTH EAST AND SOUTH WEST WING WALLS
SCALE 1/2"=1'-0"



ELEVATION VIEW PANEL J



ELEVATION VIEW PANEL K

ETKIN ANTHONY ASSOCIATES
CONSULTING ENGINEERS & PLANNERS
ROCHESTER, N.Y. CLARK HILL, PA.

11 JUL 77
DATE

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REVISIONS

NO.	DATE	DESCRIPTION	REV.	CK'D

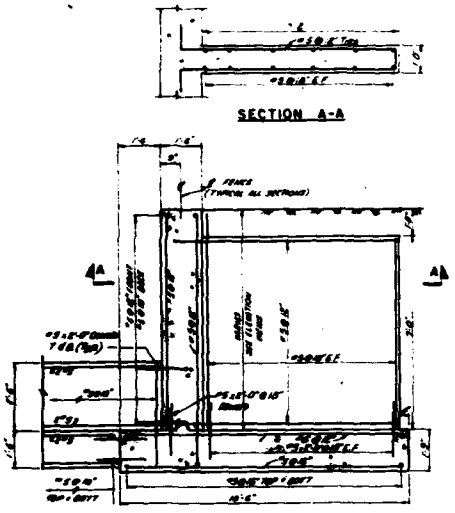
PROJECT NAME
ENGLISH ROAD
DETENTION FACILITY

CLIENT
TOWN OF GREECE, N.Y.

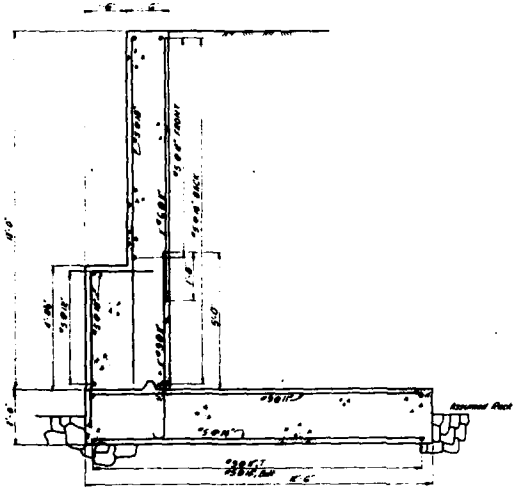
DRAWING TITLE
STRUCTURE NO. 1
WINGWALL DETAILS

SCALE	DRAWN BY
3/8" = 1'-0"	S-S
DATE 10/77	SHEET NO.

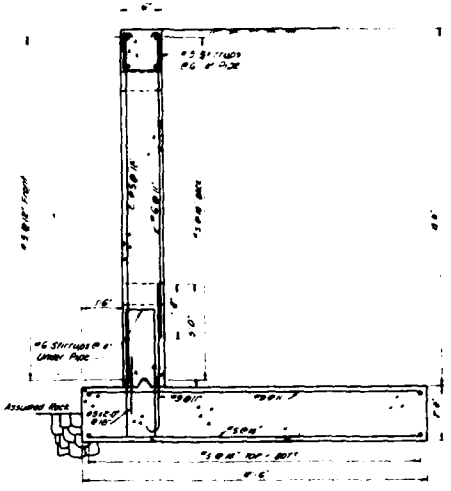
FIGURE 12



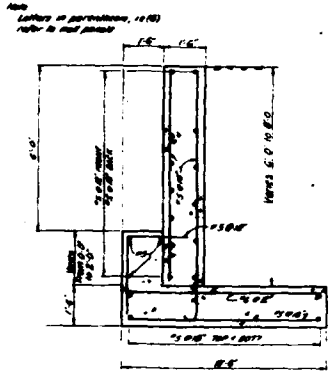
PANELS A & B
EAST & WEST WALLS



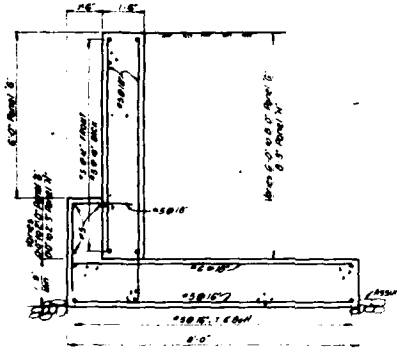
PANEL I
WEST WALL



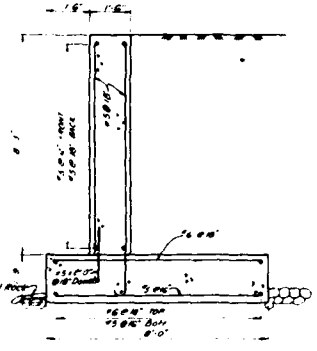
PANEL K
WEST WALL



PANELS C THRU F
EAST & WEST WALLS



PANELS G & H
EAST & WEST WALLS



PANELS I & J
EAST WALL

EDMAN ARTHURY ASSOCIATES
CONSULTING ENGINEERS & PLANNERS
ROCHESTER, N.Y. GOOD HILL, PA.

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REVISIONS				
NO	DATE	DESCRIPTION	REV	DATE

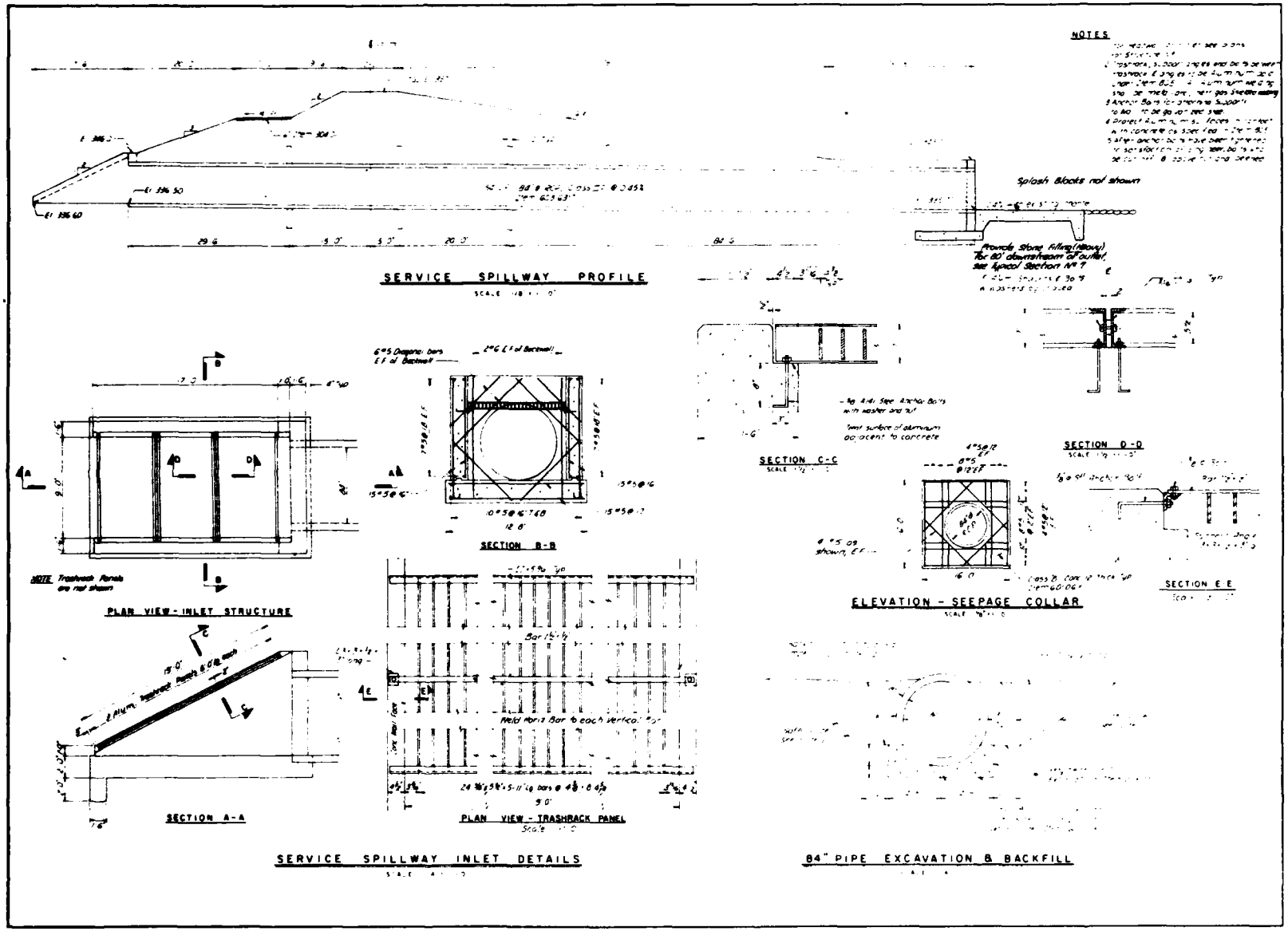
PROJECT NAME
ENGLISH ROAD
DETENTION FACILITY

CLIENT
TOWN OF GREECE, N.Y.

DRAWING TITLE
STRUCTURE NO 1
TYPICAL SECTIONS

	DR B: EJR	S-6
DATE 7-18-77	CH B: ECT	SHEET NO
	DATE 7-27-77	

FIGURE 13



ERDMAN ANTHONY ASSOCIATES
CONSULTING ENGINEERS & PLANNERS
ROCHESTER, N.Y. CAMP HILL, PA.

DATE DATE

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REVISIONS

DATE	DESCRIPTION	REV	CK'D
10/5/77	Rec'd Spillway Revisions	ECT	EK

Use
Revision Sheet
Rec'd 6 Aug 77

PROJECT NAME
ENGLISH ROAD
DETENTION FACILITY

CLIENT
TOWN OF GREECE, N.Y.

DRAWING TITLE
STRUCTURE Nº 2
DETAILS

Drawing No. S-7
Sheet No. 16 of 16

FIGURE 14